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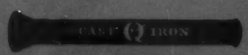

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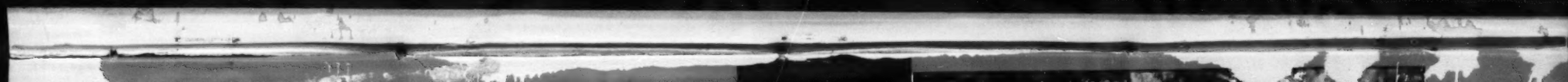

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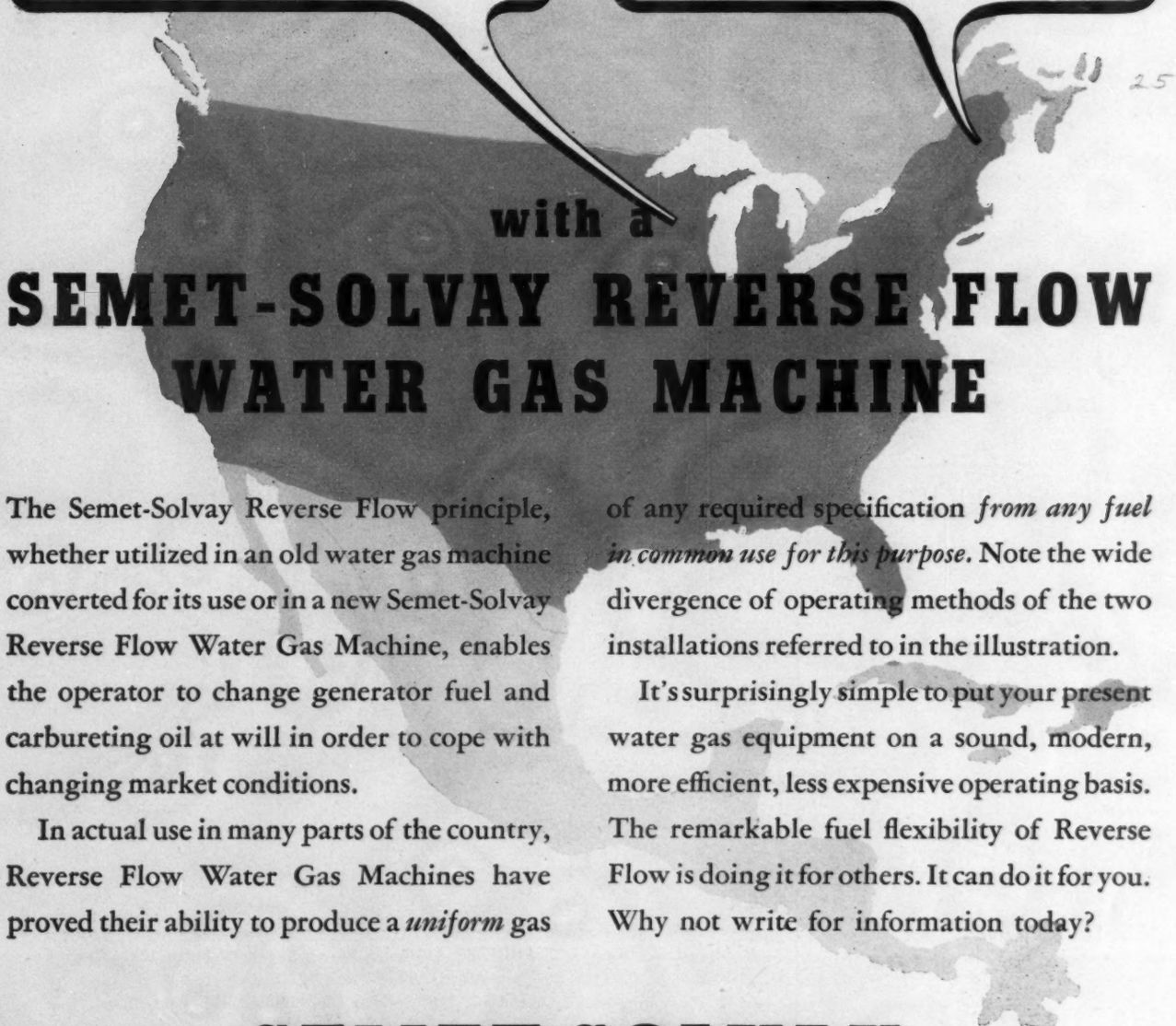

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GAS

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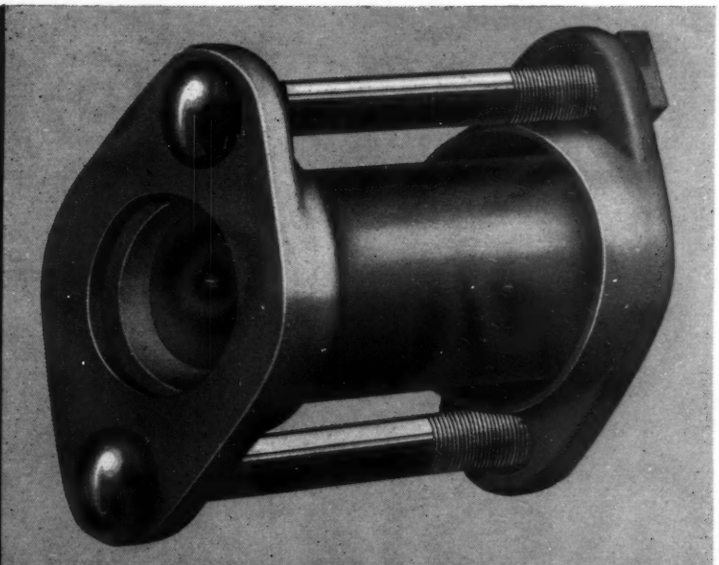

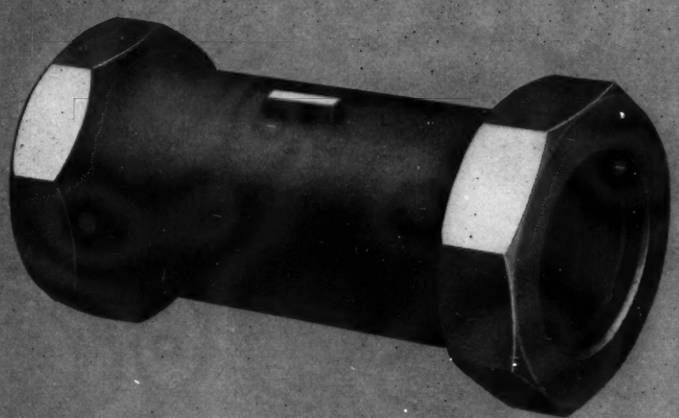

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The Dayton Boltless Coupling is constructed entirely of malleable iron. Nuts, when drawn up, completely cover threaded portion of center and apply equal pressure over gasket surface. Uses the same gaskets as bolted type coupling.

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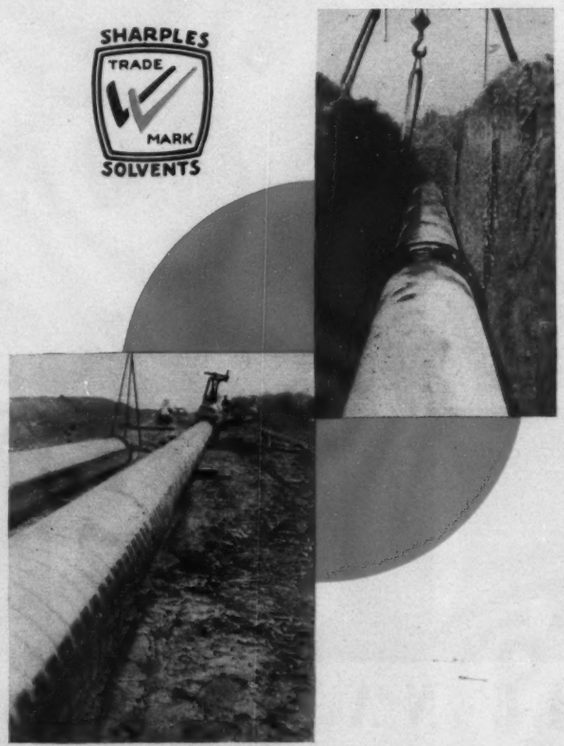

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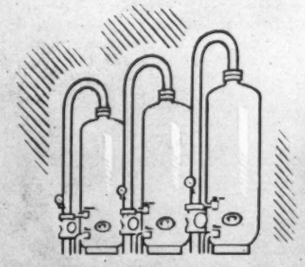
That's how customer satisfaction grows ! First she used gas for cooking; then—in order—for refrigeration, automatic water heating and house heating. But if the gas had failed her, do you think she would have extended its use? On the basis of increased consumer satisfaction alone, you are warranted in installing Blaw-Knox Gas Cleaners. In addition to insured continuity of service they give you many values . . . protection of compressors from the erosive effects of scale and sand; increased accuracy in metering; prevention of damage by dirt and rust. Blaw-Knox catalog No. 1581 tells the whole story. Ask for it.



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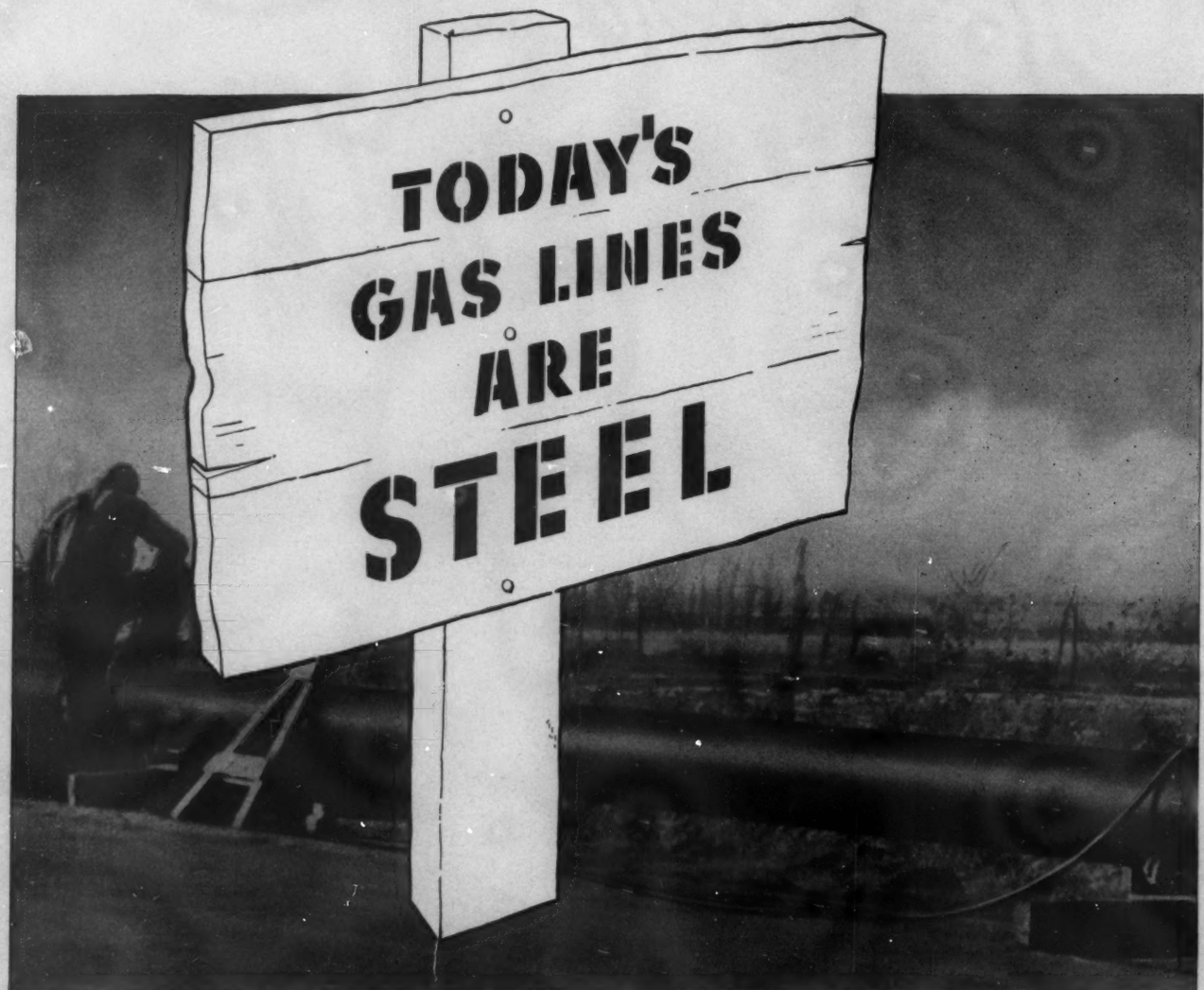

TODAY'S higher pressures, heavier traffic vibrations, and sudden shocks make steel pipe more important than ever. Only steel can offer you the extra strength you need for mains, laterals, and service lines. It gives you the most service per dollar of cost—the greatest safety that money can buy.

STEEL Gas Mains cost less to lay because steel pipe is lighter and easier to handle and is available in lengths as great as 40 feet, that reduce the number of joints per mile.

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Write for complete information on NATIONAL Steel Pipe. The NATIONAL organization is equipped to serve you speedily, efficiently, and in exact accordance with your requirements.

FOR HIGH GAS PRESSURES

For handling abnormally high gas pressures, we recommend NATIONAL Seamless Pipe, a pipe that is made without welds, by piercing solid billets of highest quality steel. This pipe removes all possibility of localized weakness, and assures full wall strength throughout. NATIONAL Seamless is available in sizes up to 24-inch O.D. Write for Bulletin No. 23.

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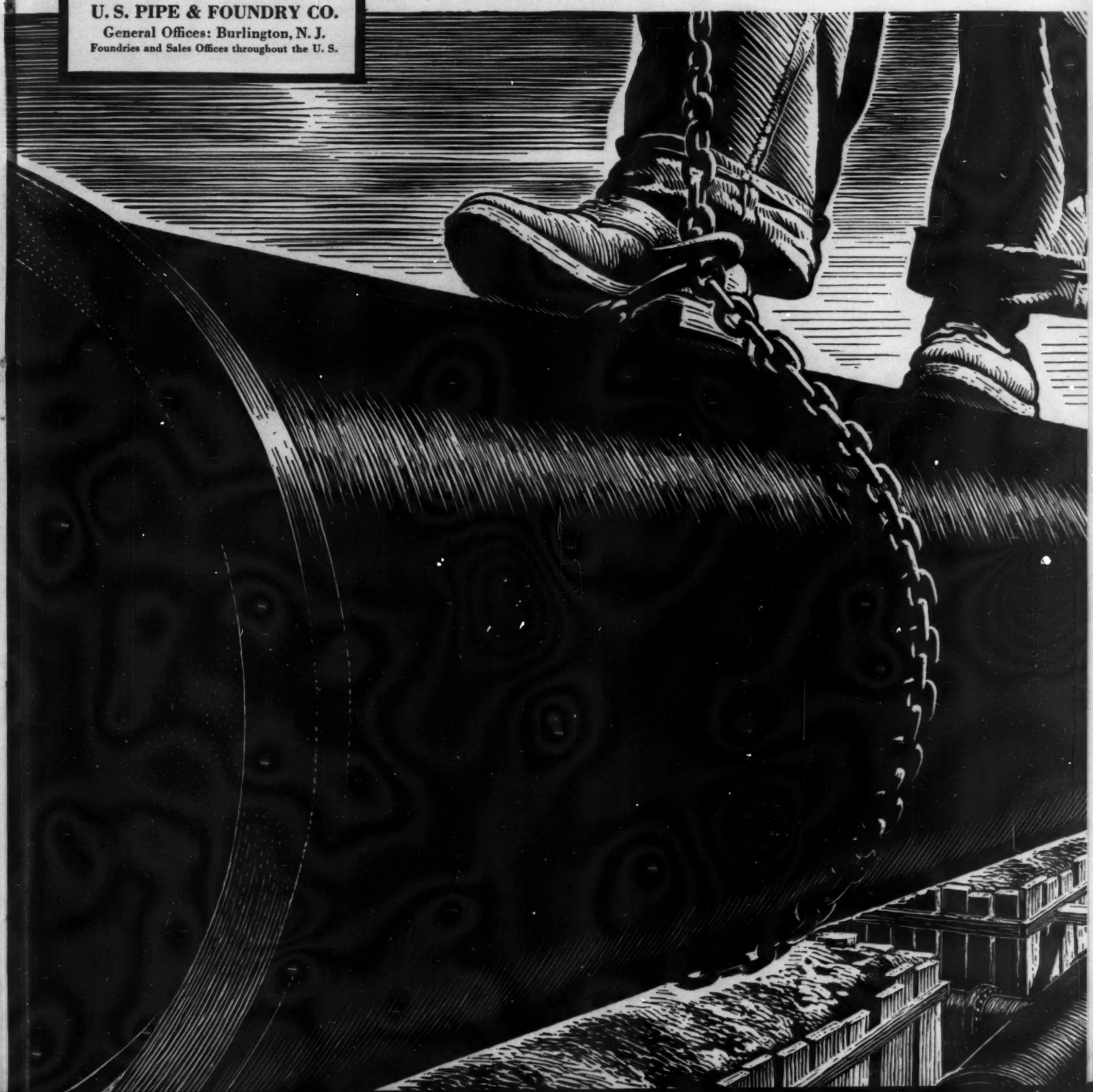
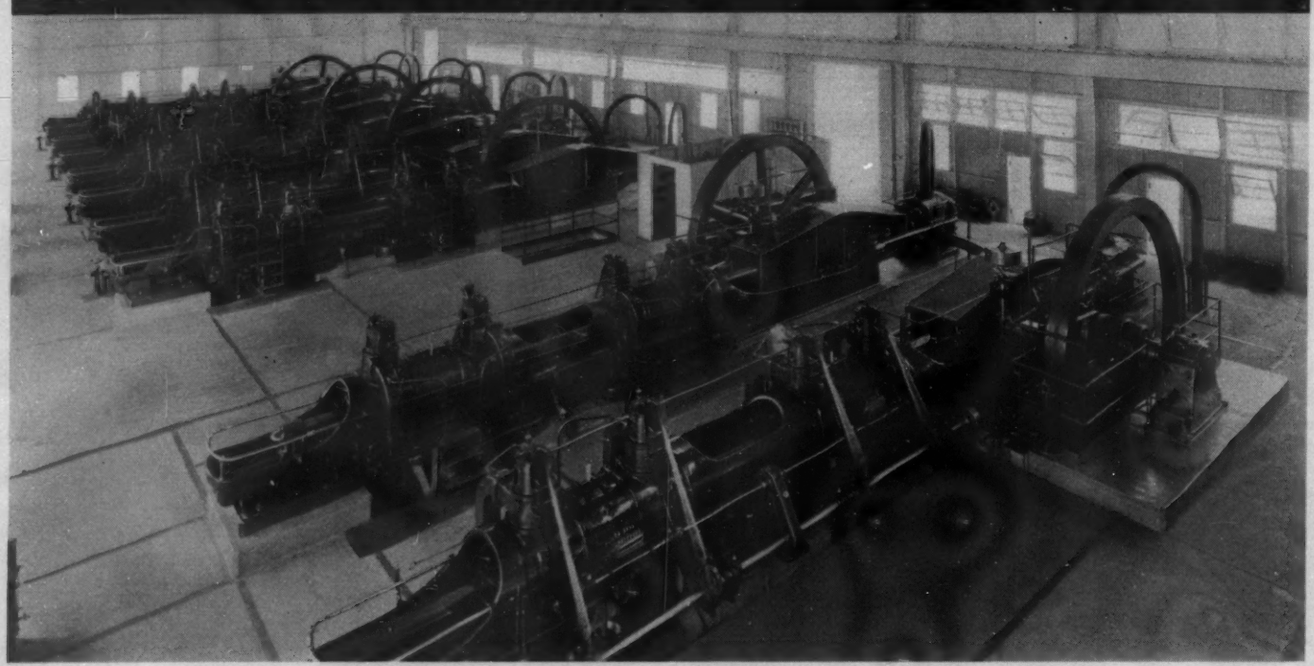
AS time goes on, estimates of the life-expectancy of cast iron pipe grow higher. In an address at a convention last month a nationally known water works engineer put it at 180 years. However, history has yet to limit the span of useful life of cast iron pipe. We, who make it, are content to say—*more than a century.*



26 YEARS of pumping Gas to Los Angeles!



Southern California Gas Company's largest compressor station! — with 5,200 horsepower, capable of transmitting 90 million feet of gas each day — is powered with Cooper-Bessemer compressors!

First of the large transmission plants in California — built in 1913 — Taft Station is proof conclusive of the ruggedness, long life and overall economy of Cooper-Bessemer compressors. No modern company would keep *and use* them 26 years if they didn't measure up!

Today's Cooper-Bessemer compressors are even better than they were in '13. They are compressors which can show you profits from the start — and especially in the long run. Write for facts.

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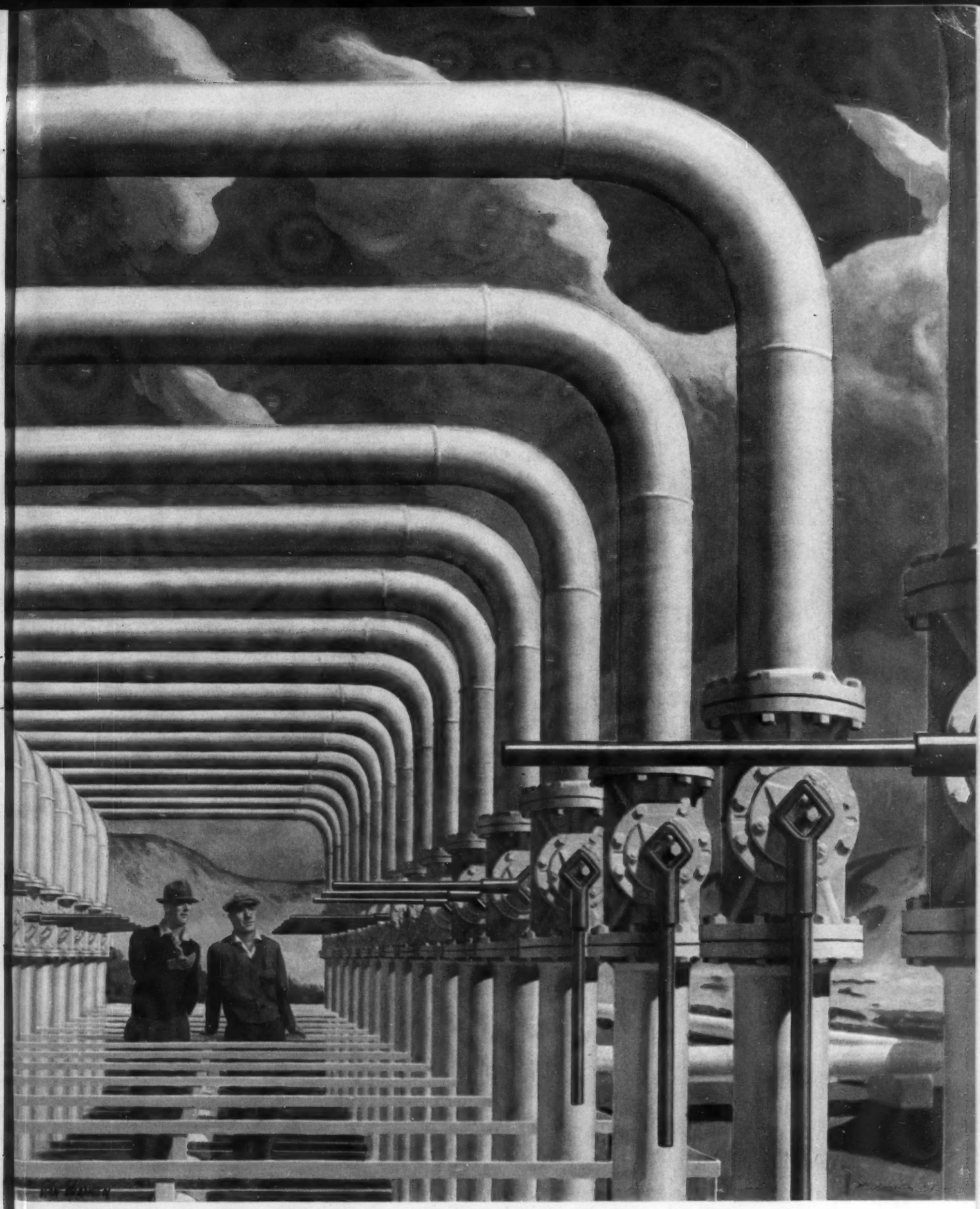

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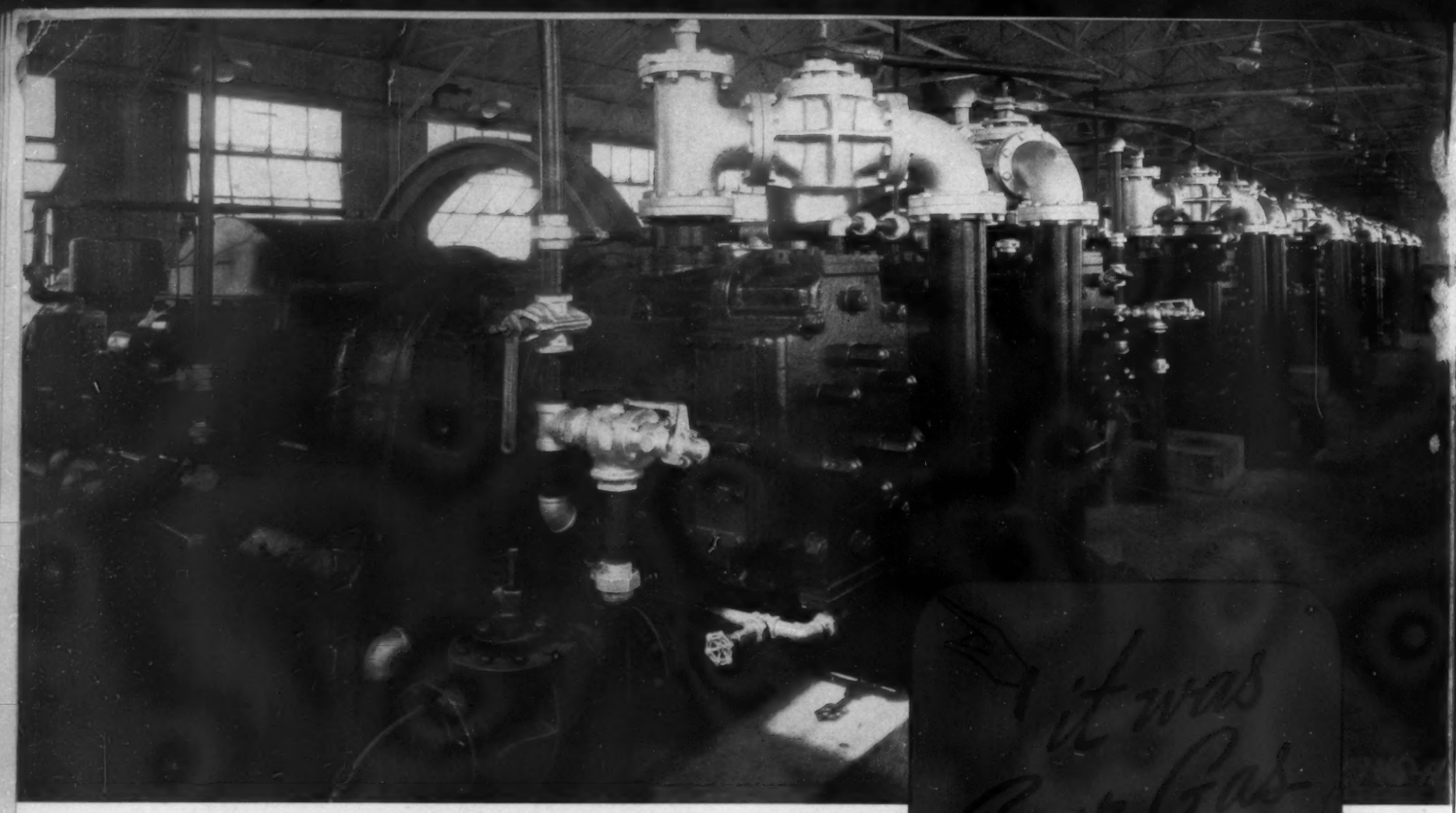

"It was Sour Gas — so they changed to NORDSTROMS"

EMCO Regulators and Nordstrom Valves on gas distribution manifold at a Michigan gas company's plant.

Nordstrom Valves on gas lines at meter house.

The 6" Nordstrom Valves, shown above, operating at 250 lbs. working pressure on compressor lines, replaced gate valves due to the fact that sour gas is being processed. Nordstrom Valves are most satisfactory under these conditions.

Lubricant, suited to the service, protects the plug and body contact surfaces. Corrosion and erosion are prevented. The plug is never separated from its seat of lubricant. The patented "Sealdport" system of transmitting lubricant under pressure to the chamber under the plug, for lifting and sealing purposes, forms an impenetrable circuit or seal of lubricant around each port whether the valve is open or closed. Leakage is prevented. Ask for Catalog.

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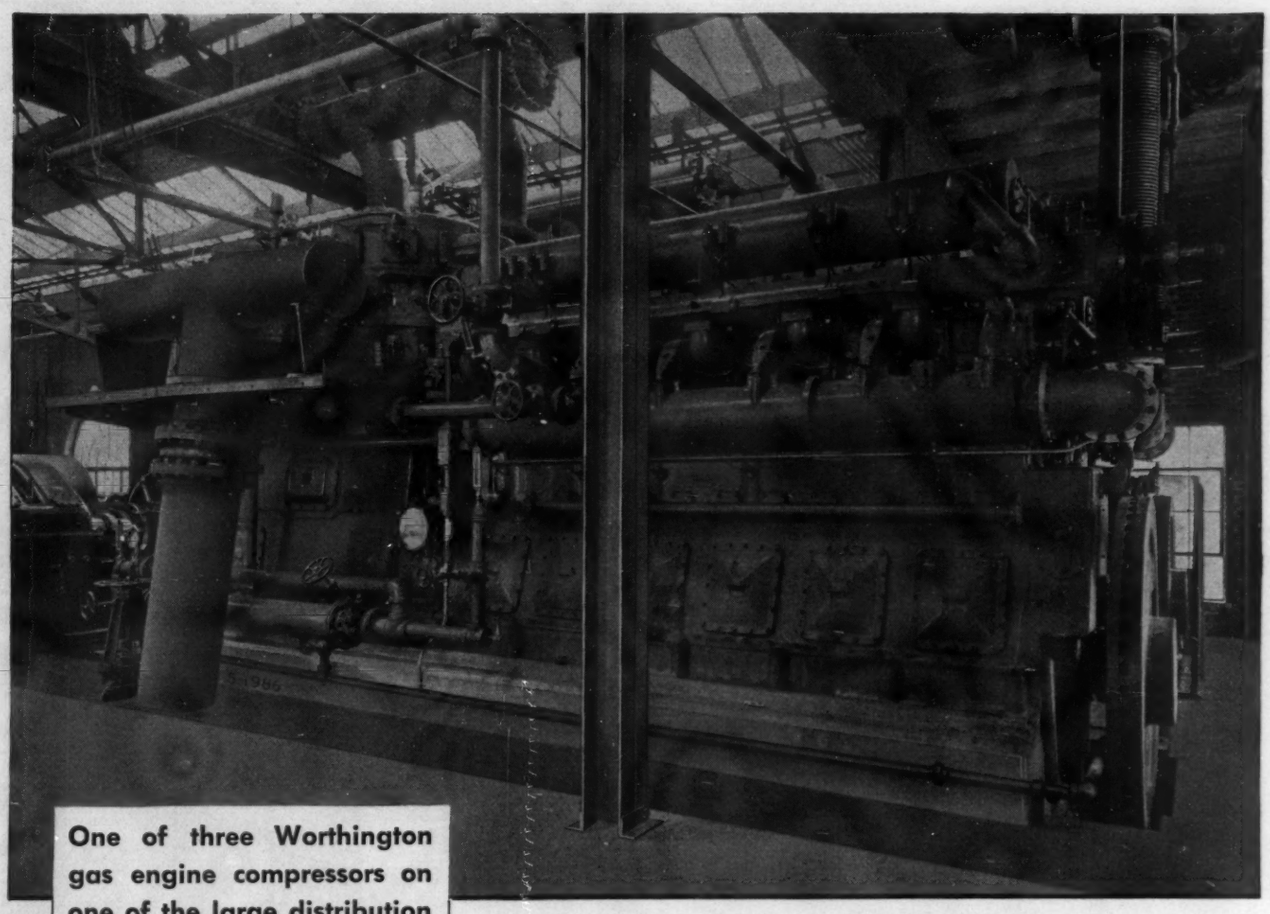
WITH PATENTED "SEALDPORT" LUBRICATION

Only Nordstroms meet every major valve need



One of three Worthington gas engine compressors on one of the large distribution systems supplying gas for the NEW YORK WORLD'S FAIR and adjoining area, and installed by CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., at its Astoria, Long Island, Station.

These three units have a total capacity of 921,000 cu. ft. per hour against 30 pounds discharge pressure.

WORTHINGTON VERTICAL GAS ENGINE COMPRESSORS

- For economical, heavy duty service
- Less space and foundation than any other type
- Simplify piping connections
- 4-cycle, with force-feed lubrication throughout, therefore economical in fuel and lubrication
- Double-acting compressor cylinders

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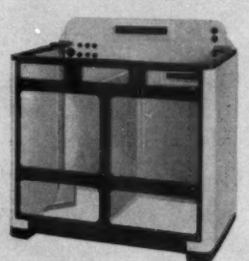
A New Stimulant for *the Jaded Sales appetite!*

ONE-PIECE MONITOR DIVIDED COOKING TOP . . .

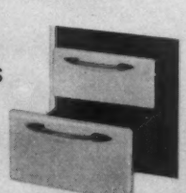


ONE-PIECE SHOT-WELDED UNIT BODY CONSTRUCTION

ONE-PIECE SHOT-WELDED PRECISION OVEN

ELEVATED IN-A-DRAWER BROILER

TWO SERVICE DRAWERS



AN *Exciting* NEW *Gas Range*

● The Mercury Universal is not just a revamped model of an existing gas range—it is entirely new. It provides the gas range salesman with one of the most important of all sales stimulants—that is, something new, something better to talk about—something different to demonstrate. The Mercury Universal is of shot-welded, unit-body construction, which type of steel fabrication has been proved by the acid test of field experience to be the strongest of all methods of steel body structure. We suggest that you write for full details regarding the new Mercury and Monitor Universal one-piece, unit-body gas ranges.

UNIVERSAL GAS RANGES

CRIBBEN & SEXTON CO. • 700 N. SACRAMENTO BLVD. • CHICAGO

GAS
JULY, 1939

GUEST Editorial

Today and Tomorrow

Gas Marches On!

By E. R. GUYER

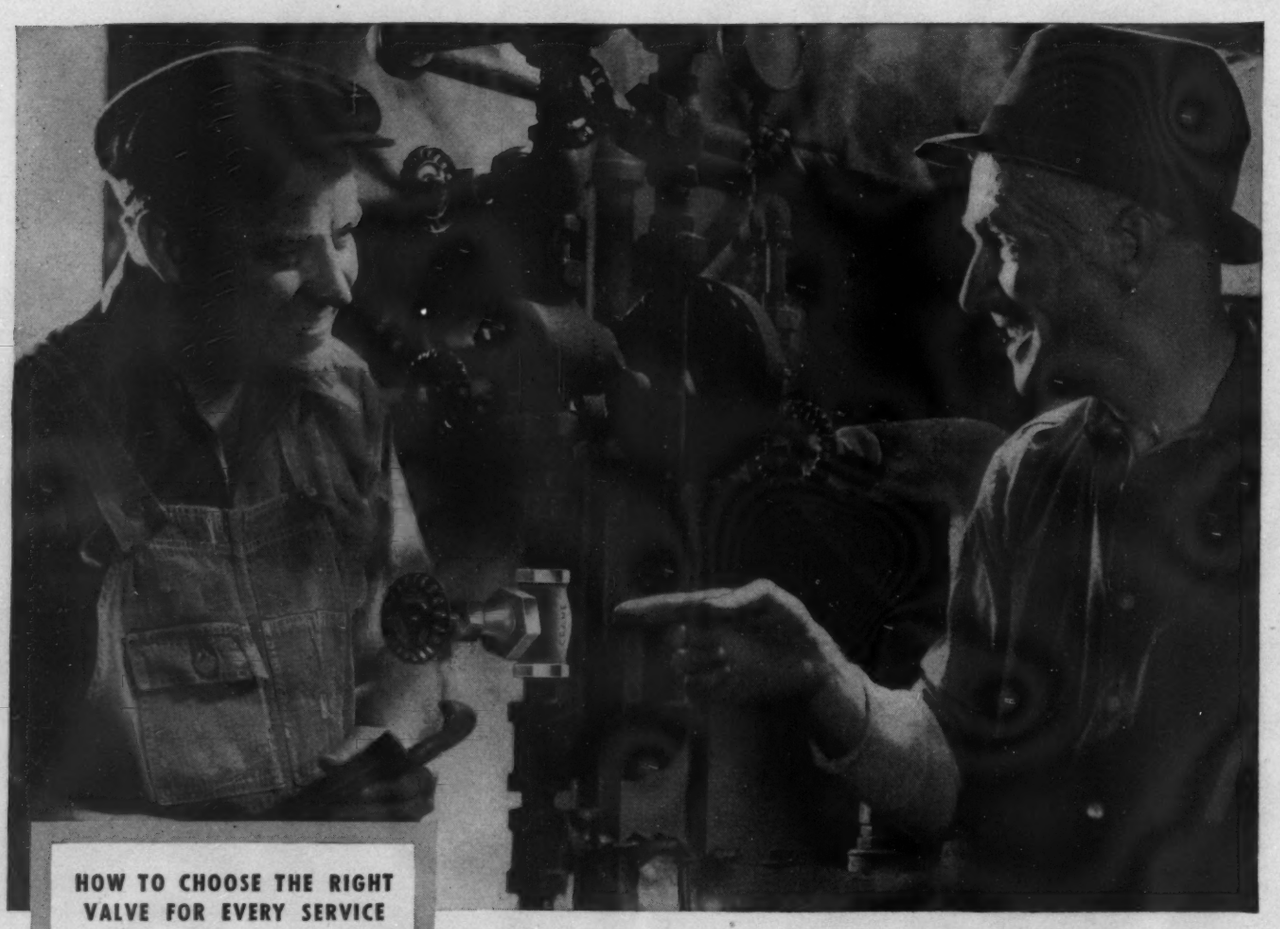
President, Association of Gas Appliance and Equipment Manufacturers

WHEN Kipling wrote, "East is East and West is West and ne'er the twain shall meet," little did he know the Gas Industry, for during a memorable May the Gas Troupe made a Cook's tour that covered the United States and two Fairs in a fortnight. We opened in Tulsa for three days with the Natural Gas Association, jumped to San Francisco for a two-day stand with A. G. A. and then crossed the continent to New York for an engagement with A.G.A.E.M. in that stirring drama, "The World of Tomorrow." Why join the Navy to see the world?

It was most gratifying to observe everywhere a merchandise minded industry determined to sell gas through improved appliances, exemplified by CP ranges, which clearly demonstrate the superiority of the fuel. The awakened attitude of the industry was apparent in the text of addresses made by top executives and in aggressive, well edited articles appearing currently in gas publications emphasizing the great necessity for increased development, research, and promotion. Our promotional committees headed by Messrs. Houston, Tappan, and Agee have ably organized the reeducation of sales departments throughout the country, imbuing them with enthusiasm for this new departure in merchandising. And clever women in home service who best know the needs and preferences of the modern homemaker are visually demonstrating to the women of America the startling improvements in the use of Gas. These efforts supplemented by A.G.A.'s national advertising campaign should reach every possible consumer and sell her aggressively on Gas as the preferred fuel when used through modern appliances.

The world may see the progress of Gas at beautiful Treasure Island located in San Francisco Bay and this view is climaxed when, at the "World of Tomorrow" and in our own Gas Exhibits Building we see the most advanced cooking, heating, and refrigerating appliances, amid settings designed to best enhance their value. The industry owes a debt of gratitude to Mr. Hugh Cuthrell and Gas Exhibits, Inc., for their vision, not only in accentuating the known superior qualities of Gas for the four big jobs, but in demonstrating the new, modernistic, and spectacular illuminating effects possible with Gas as the fuel.

As proof that others have noted progress in our industry, United Business Survey in a recent issue, not only indicated improvement by means of charts, but definitely advised for immediate purchase the stocks of three of our gas companies. All of the time, effort, and money expended in improving our condition must be continued if we can say that in the World of Today, as well as the World of Tomorrow —"Gas Marches On."



HOW TO CHOOSE THE RIGHT VALVE FOR EVERY SERVICE

Economical valve performance begins with proper valve selection. In the broad line of valves offered to industry, there is one that is best suited to each service in your plant—one that will give dependable flow control at minimum cost. "Trouble spots" and high maintenance costs often result solely from mis-matching of valve and operating conditions of the line.

Crane's bulletin—"Service Characteristics of Globe Valves and Gate Valves," with its Valve Selection Guide will help you avoid mis-application of valves. It shows you the way to low-cost valve maintenance. Get a *free* copy from your Crane Representative—or, write today.

"THERE'S FLOW CONTROL *that stops profit leaks too!"*

MEN who buy or use valves are obviously familiar with them. From experience, they are in a position to know the value of quality in valve design and construction—even in the finest degrees. They know, too, and better than does the front office, how small losses caused by inefficient valves may seem negligible—yet can easily mount up to an important figure that shows in the profit and loss statement.

Crane valves are engineered to stop even the small losses. The extreme accuracy of their manufacture and the careful analysis and specification of the materials that go into each part assure long, economical service and few time-wasting replacements.

Regardless of what your piping problem may be—regardless of how specialized your field—you will find the valve you want in the complete Crane catalog which includes more than 38,000 items. Consult the Crane Representative regarding valves and fittings to meet your specific requirements.

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NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

THERMALLY *Thinking*

Low Cost Equipment

G A S has consistently supported the thought that our appliance and equipment manufacturers are entitled to a fair profit and that "chiselling" them below their necessary margins hurts the industry far more than it helps.

There comes a time, of course, when close figuring is necessary, especially when gas load otherwise unattainable is at stake. But it is unfair to expect the manufacturer, whose equipment represents a one-time profit, to take all the "rap."

A case in point is the space and water heating equipment specifications of the National Lumber Manufacturers Association for 1939, in connection with their low cost housing program.

It seems an awful pill to swallow to ask gas appliance manufacturers to supply space and water heating units for $125 installed in new houses ranging from $2000 to $3000. If it can be done, we are told gas equipment will be specified. Apparently they have in mind a floor furnace, or a direct circulating heater and fan installed in a closet, or some similar space-saving location. If such construction is going to predominate during the next few years and the load potential is interesting enough, then the gas industry must be prepared to fill the bill. It will mean ditching many of our present quality of construction standards perhaps, but if our fuel competitors can do it, it certainly seems up to us to meet the challenge.

Gas Street Lighting

Is it too late to recapture the waning street lighting load? There are many alert gas men who think not. In fact with the modern gas street lighting equipment available today, they are visualizing a time in the near future when once again our city streets will be better illuminated and at a lower cost with gas.

Our British friends, who are paramount in the gas street lighting field, are more than holding their own in the face of governmental and municipal electric competition.

In Great Britain, there are over 800,000 gas street lamps which if staggered at 50-yard intervals are enough to stretch around the world. The number of gas street lamps and the gas load from them is increasing rapidly. Since 1921, the street lighting load in Great Britain has more than doubled and has now reached a colossal total of 14,500,000,000 cu. ft. per year. And thousands of new gas lamps are being installed every year.

The snag in the United States has been our refusal to modernize our gas street lighting equipment, making it a relatively easy victim to better engineered electric units.

If economy, practicability, and dependability mean anything and the industry wants this load badly enough, there is nothing, as we see it, to prevent us from getting it.

But it will take an honest-to-goodness brand of salesmanship—and we are capable of that, too,—when we get sufficiently interested in any profitable load.

Front

In the Army it is axiomatic that smartly turned out soldiers symbolize a well-trained and disciplined battalion. "Spit and polish" is the outward and visible sign of military efficiency.

A similar thought is behind the three or four year program of the Southern Gas Association to promote business progress. It is significant that the committee organizing and directing the program under the chairmanship of C. B. Wilson, new business man-

ager, Little Rock Gas and Fuel Co., Little Rock, Ark., should have devoted its initial efforts to a clean-up, paint-up and property beautification campaign.

C. H. Zachry, vice-president, Southern Union Gas Co., and president of the Southern Gas Association, is enthusiastically supporting the plan, which is just about as timely as any we know of today.

The Southern Gas Association committee to promote business progress in its report summarizes the situation as follows:

> "To sum up: Our industry is confronted with an acute competitive situation. There is a current public opinion that we are not a modern industry. As our first step, therefore, let us clean up, paint up and tie in locally with nationally advertised gas industry slogans. Now is particularly the time to do these things, because both in New York and San Francisco there are extensive exhibits pointing out the merits of our industry and our product. However, the people who see these exhibits will see also, in traveling across the country, the part of the gas business which is above the ground. Let's make as good an impression as possible, so that the opinion they form when they see the business will be the same as the opinion we want them to get from the exhibits."

In other words, just as Shakespeare put it—"Apparel oft proclaims the man," the gas industry is no more modern than it looks—in the public's estimation. Right!

On page 25 of this issue, we present a paper "Putting Color to Work," by J. A. Meacham, Pittsburgh Plate Glass Company, which is well worth the serious attention of every gas man interested in bettering the appearance of his properties.

A Sound Investment

Within the last three months there have been three significant statements on the investment possibilities of the gas industry. In the May issue of *GAS* there appeared exclusively an article entitled "A Stockbroker's Analysis of the Natural Gas Industry," by John Nickerson, III, a New York stockbroker. It was an investment study revealing a thorough knowledge of the subject, combined with an independent viewpoint of our industry which surely must have gladdened the hearts of those who read it. At Tulsa, Frank R. Denton, president, Mellon Securities, Inc., Pittsburgh, commended both the industry's financing and its competent management, which coupled with adequate gas reserves and an expanding market gave the natural gas industry a high and well deserved credit rating.

At the executive conference of the A.G.A., at San Francisco, Percy S. Young, chairman of the executive committee, Public Service Corporation of New Jersey, delivered an address entitled "Investment Attributes of Gas Utility Securities." This has been issued in booklet form by the A.G.A., and it is recommended as fine physic for those gas men who have been unduly impressed by the alleged prognostications of our babbling Babsons and their ilk.

The utility business is such that it must have a constant source of new money to progress. The gas business needs approximately $5.00 of new capital to provide for every $1.00 of added revenue from new service facilities.

The New Dealers have done much to discredit all business, irrespective of its merit as a suitable investment for idle funds, and to a great extent they must assume the responsibility for having well nigh wrecked the only real source of American wealth—industry.

The gas industry, however, is too vital a public necessity to be snuffed out to placate the theories of the "ists" in Washington.

Today, the investing public is perhaps bewildered by political platitudes. The gas industry owes it to itself to present its own financial facts and figures persistently and intelligently, in order that public investing confidence may be restored.

Early Training

An appliance salesman soon learns that the hardest sales obstacle he faces is the reluctance of the average woman to depart from her present methods—especially in cooking. And conflicting with this feminine characteristic is that same average woman's innate desire not to be outmoded. How else can one explain this year's crop of hats?

So, she is apt to say "no" when first approached to buy a CP range and yet listens very enviously to the stories her daughter tells her about the cooking equipment they use in the home economics class at school, if . . . ? . . . *If it is a CP range.*

We have noticed for some time intensification of the effort to electrify school cooking equipment. It is a double-barrelled threat in that it is influencing young people at a most impressionable age, and indirectly swaying the proud parents who listen to their offspring's school experiences.

Some gas companies (Binghamton, N. Y., is an outstanding example) are taking this threat very seriously and more than holding their own.

CP is excellent for school use. First, it has an operating economy that appeals to the authorities. Second, it makes the science of cooking so much easier, and third, it is a time-saver that fits right into today's crowded curricula.

And by way of more than an afterthought, it is well to remember that today's schoolgirls are tomorrow's housewives and the rulers of our fate in the domestic field.

We cannot begin our gasification educational program too early and a CP range in every public school is a mighty good place to begin.

The Mass Market... No. 5

In Which Are Examined the Space Heating Load Possibilities in Manufactured Gas Territories

By STANLEY JENKS

EVERY industry needs its idealists, but the last place in which they should be found is the sales department. There, stark realism should be the keystone of all fundamental sales planning.

It is not a question of making ideals materialize, so much as facing facts and "calling 'em as you see 'em" to sell gas advantageously and profitably. A gas company, while it renders a highly desirable social service and economically merits its place in the community it serves, nevertheless is operating primarily to make money. Why this preamble? Simply because the records show that many gas company sales managers are apparently "reformers" at heart, rather than realistic fuel salesmen.

In approaching the "mass" market, it is surely not our mission in life to reform people's methods of living to our preconceived standards, which they frankly cannot afford, so much as to find ways and means to make our fuel fit their present ways of doing things, which are set by conditions beyond their and our control, and which they are probably just as anxious as we are to improve. For example, a family in New England lives in a so-called "railroad flat" because it cannot afford anything better and not solely because it can use coal or oil direct heating.

This is not the place to discuss the relative merits of direct and indirect heating. The former is more efficient; the latter is more popular in homes with the facilities to house it. But a question worth asking is: How much central or indirect heating is prevalent among those 90 per cent of our customers whose average monthly gas usage is less than 20 therms? And to cap the thought behind this question, let's ask another. Is there any chance to get some of the direct heating business with gas by replacing the present fuels used? *And without asking the customer to change his heating system either.*

Very obviously, the problem boils itself down to a question of cost of operation, with a further split into partial or total use. Cost of operation is contingent on the gas rate and the utilization of over-all efficiency of the gas equipment used. For the purpose of this study, I have taken New England, which is entirely manufactured-gas territory.

In presenting a picture of New England today, I am indebted to Roy E. Wright, assistant to the vice president, New England Gas & Electric Association, Cambridge, Mass. He presented the figures shown in Table No. 1 at the last annual convention of the New England Gas Association. Oil is the big competitor in the New England house-heating market.

"Unfortunately," comments Mr. Wright, "they not only captured the heating market, but also the water-heating market where a central heating oil job was sold. Where the gas company sold a water heater and later the oil man sold a central heating job, the gas company lost the water-heating load. For this reason, today, the water-heating load is no longer a stable one.

"The figures in Table No. 2 point out the relation of central-fired oil jobs to the water-heating load.

"What effect has this selling trend had on new home developments? It is an admitted fact that the oil industry has obtained a very high percentage of the space-heating market. With the acquisition of this space-heating market, it usually acquired also the water-heating load, and, the customer is led to believe, at no additional operating expense to him. Two important facts follow this trend: (1) As new home building goes, so goes the old; (2) Our better type of customers move into the new homes and we are left with the poorer and unprofitable type of customers.

"A.G.A. statistics show that:

1. Approximately four oil heating jobs are sold to one gas job.
2. Each of these oil jobs prevent the sale of a gas water heater for a long time to come.
3. A gas water heater consumes about 36 M c.f. per year.
4. Thus, every four oil heating jobs sold represent a potential of 144,000 cu. ft. of gas per year.
5. At 85c per M c. f. this represents $122.40 of revenue.
6. A gas heating job averages 300 M c. f. per year.
7. At 50c per M c.f. this represents $150.00 per year of revenue.
8. But the gas heating jobs represent a new business expense as high as $100.00 per job.

"This situation offers a clear challenge.

TABLE NO. 1. TWENTY-SEVEN PER CENT SATURATION OF OIL BURNERS

State	*Number of Urban Dwellings*	*Per cent Central Heating*	*Per Cent Oil*	*Central Coal*	*Heating Gas*	*Using Wood*
Maine	63,647	73.2	29.6	63.7	.8	1.9
New Hampshire	56,075	55.2	57.0	34.0	1.5	7.5
Vermont	24,784	64.5	50.9	45.9	.1	3.1
Massachusetts	638,032	62.5	36.4	59.8	.5	3.3
Rhode Island	108,001	59.4	48.6	48.9	.5	2.0
Connecticut	184,550	56.8	70.1	27.4	.5	2.0

TABLE NO. 2. NINETY PER CENT OF OIL BURNERS HAVE WATER HEATING ATTACHMENTS

Company	*Number of Domestic Meters*	*Per Cent with Oil Burners*	*Per Cent with Indirect Water Heaters*
A	30,559	10.1	8.7
B	31,715	8.3	5.6
C	39,007	21.1	20.6

TABLE NO. 3. SIXTY-FIVE PER CENT OF OIL KITCHEN HEATERS HEAT WATER

Company	*Number of Domestic Meters*	*Per Cent Kitchens Heated with Oil*	*Per Cent of Range Water Heaters*
A	30,559	28.1	3.5*
B	31,715	58.3	53.4†
C	39,007	50.0	31.7‡

* 16,139 or 52.8 per cent not piped for hot water.
†2,487 or 7.8 per cent no means of heating water.
‡5,514 or 14.1 per cent no means of heating water.

"There were over 100,000 coal and combination types of ranges in use in New England in 1938. So what! In recent years the oil man has sold a range oil burner to a large percentage of these homes. The range oil burner not only heated the kitchen, but served to cook and heat water as well. In many of these homes where we had a partial cooking load or the small water-heating load, it was lost to our competitor. Table No. 3 indicates the relation of the kitchen-heating to water-heating.

"Thus, it can be seen that the recovery of water-heating business, the stabilization of the water-heating load now on our lines, and the future of the gas water-heating business lies largely in the solution of the kitchen-heating and house-heating problems. I have no desire to discuss rates. Each company must analyze its own situation and determine what action should follow."

So, according to Mr. Wright's indisputable figures, the oil people recognize the market and its possibilities anyway. So does the gas industry, and I now quote from the paper of J. J. Quinn at the same convention. Mr. Quinn is the sales manager of the Boston Consolidated Gas Co., and his paper was significantly entitled "Kitchen Heating — Our Younger Child." In it he described the progress member companies had made in meeting this oil competition with two- and three-purpose gas ranges (cooking, water-heating and space-heating). Government surveys have shown that 60 to 70 per cent of the New England homes on gas mains require the burning of fuel in the kitchen for space-heating, and slightly more than half of these need direct space-heating for the balance of the home or apartment. It is a fair supposition that all this group lies in the low-income or "mass" market. A recent kitchen-heating survey of the New England companies, according to Mr. Quinn, is shown in Table No. 4:

"The growth in kitchen-heating has been a good bit dependent upon formulation of suitable rates," Mr. Quinn said. "There has been considerable advancement made in this direction. However, much indeed remains to be done. The new business taken on to date by and large has been secured at a somewhat premium price over that quoted for an unrefined competing fuel.

"While sales to date have in general been made to customers in the medium-income class, the majority of whom have a central heating plant, *there is a growing recognition of the fact that with suitable rates the market is both vast and salable.* It is up to our company members to design rate schedules to fit their local needs and possibilities. More companies are now using, and others are considering the adoption of, a rate that is strictly competitive with prevailing prices of crude fuel. At least one group of companies now offers evidence that this can be done without sacrifice to existing revenues.

"Let us consider for a moment this potential market in its entirety. There is a need for kitchen-heating at some time during the year in every home located in a climate where room or central heating is required. This need may be divided roughly into three classifications.

1. Those who need auxiliary heating in early fall and late spring before and after the furnace is in use and on chilly mornings and evenings during inclement weather.

"This auxiliary heating market offers an increased annual consumption of from 79.5 to 134.5 therms per customer per year. It is readily available to development on a gas rate that will prove suitable for the cooking and water-heating load.

2. Those homes having no kitchen radiation connected to their central heating plant, or where the radiation is ineffective.

"This group, requiring all-winter heating of the kitchen, *but the kitchen only*, primarily needs from 212 to 265 therms of gas for space-heating, and for this market a slightly lower price is required, but substantially above the levels required for central heating. The greatest progress in the development of kitchen heating in the past five years has been done in this division of the market — particularly is this so in Connecticut and in the Boston area.

3. The very large group of dwelling units occupied by the low-income customers that have no central heating plant and therefore are likely to depend on the kitchen-heating equipment for such heat as is used in the entire house or apartment.

"This third group, requiring all-winter heating of the kitchen and the other rooms of the house or apartment, offers a different problem in the way of equipment, price of gas and method of selling because it is more nearly the equivalent of central heating rather than what we consider as strictly kitchen heating. This field is the largest market, but likewise is the most difficult to develop because of the varying conditions encountered, the lower price required for gas and at present the unfavorable economic condition of so large a number of the potential users. Here, some companies have used a two-service range for the kitchen and one or more gas space-heaters for the other rooms. Other companies have used a high-capacity conversion burner installed in a utility or coal range, and in some cases a burner has been in-

(Continued on Page 37)

TABLE NO. 4

Number of companies reporting	50
Number of meters represented (70 per cent of total N.E. meters)	910,000
Number of kitchen heating installations, December 31, 1938 (Ranges, 70 per cent; Burners, 30 per cent)	8,750
All purpose annual M c.f.	675,400
Total annual revenue	$580,400
Average M c.f. per installation	77
Average rate—cents per M c.f. (530 B.t.u. gas)	86

TABLE NO. 5

Family income	$1740.00
6.5 per cent available for light and fuel	113.00
Lighting	24.00
Cooking*	25.20
Automatic refrigeration	17.28
Water and space heating	46.25

*A.G.A. 1938 rate committee 127.2 therms @ 19.9c per therm.

TABLE NO. 6

Quinn Classification	*Average Added Therms for Water and Space Heating*	*Bugeted Amount Available*	*Price per Therm*
First	107	$23.52(a)	21.0c
Second	238.5	35.28(b)	15.0c
Third	530	46.52(c)	8.5c

(a) 50 per cent, (b) 75 per cent, and (c) 100 per cent of customer's water and space heating budget applied to gas.

THE INVESTMENT ATTRIBUTES OF GAS UTILITY SECURITIES

By PERCY S. YOUNG

Public Service Corporation of New Jersey, Newark, N. J.

THE soundness of the gas industry from the long term point of view is unquestioned. It is one of the three large public utility industries using the public streets for the service of the public. The approximate investment in plant and equipment of these industries as of January 1, 1938, was: electric, light and power—$13,000,000,000; telephone (Bell Companies) —$4,400,000,000 and gas—$4,400,000,000. From 1929 to 1937 there was invested approximately $2,000,000,000; $800,000,000; and $400,000,000 in the electric light and power, telephone, and gas industries, respectively. While operating income decreased for all three industries during this period, it is significant that this decline was in face of a substantially smaller amount of new invested capital on the part of the gas industry. During the 10-year period from 1929 to 1938, which except for the first year broadly covers a period of depression, it is found that each of these industries has shown remarkable stability. Revenues were as shown in Table No. 1.

From 1929 to 1933, the low point of the depression, there was a maximum decline in revenues of only 19½ per cent for the telephone industry, while the decline for the electric light and power industry and the gas industry was only 9½ per cent and 13 per cent, respectively.

Investment Characteristics

Investment in plant and equipment by the gas industry is in property of long life accompanied by low rates of depreciation. It does not suffer the substantial plant losses which often accompany revolutionary technological changes in many other industries but can benefit from the technical improvements now being developed for more efficient production. Its raw materials are not subject to wide price fluctuations and its by-products are bringing an increasingly larger return because of a widening demand. The amount of labor employed is small in relation to total expenditures for production and distribution. It is relatively free from political attack and direct governmental competition. The prospects for obtaining a balanced load with greater diversity are improving and should result in a greater utilization of plant. Its rates are generally competitive and are subject to adjustment upward without appreciable loss of business under the present system of state regulation should economic changes require such revision. Because of its stability, lower ratios of earnings to fixed charges can be maintained without detracting unduly from the investment appeal of its senior securities.

• MR. YOUNG, who is chairman of the executive committee, Public Service Corporation of New Jersey, Newark, N. J., presented the paper, "Investment Attributes of Gas Utility Securities," before the Executive Conference of the American Gas Association, Fairmont Hotel, San Francisco, Calif., May 15, 1939. Excerpts from this paper are published herewith.—EDITOR.

Investor Experience

The author is indebted to Dean John T. Madden and Dr. Herbert B. Dorau of New York University for statistical material recently prepared under their direction dealing with the experience of investors in public utility securities during recent years. This analysis necessitated a study of the following factors: (1) the changing market value of the securities; (2) the extent to which interest and dividends were paid; (3) receiverships.

They point out that usually there is a tendency to understate or overstate the investor's relative status at specific times by ignoring the interest and dividend record and by measuring it only in terms of the market value of the securities which he holds. The maintenance of interest and dividend payments over an extended period should be given at least as much weight as the record of market price. Furthermore, the record of receiverships among divisions of the industry and a comparison with other industries is valuable in testing the experience of investors in a selected industry.

The experience of investors in gas utility securities has been exceptionally favorable. The record indicates unquestionably that they have been underrated, and that they compare quite favorably with the record of straight electric and combination electric and gas company securities.

Market Value Changes

The survey of the amounts invested in public utility bonds and preferred stocks of both holding and operating companies by types of service and a comparison of relative profits and losses, as measured from issue prices, illustrate how the holders of securities of each type of service fared on selected dates over an extended period including one of the worst deflations on record.

The distribution of public utility bonds in terms of type of service is shown in Table No. 2.

Although a large proportion of the total invested of over six billion dollars is represented by issues of straight electric and electric and gas companies, it does not detract from the value of comparison and an examination of relative profits or losses as measured from issued prices is interesting. (Table No. 3.)

As of December 31, 1933, the date at which the maximum loss was recorded, the bonds of straight electric companies were selling 29.9 per cent below issue price; the issues of gas and electric companies 21.9 per cent and gas companies 24.3 per cent. On December 31, 1936, the bonds of straight electric, gas and electric, and gas companies had all advanced above issue price and were 1.3, 2.0, and 2.2 per cent, respectively, above their issue prices. The issues of gas companies declined slightly more rapidly in the earlier years of the depression than straight electric and combination electric and gas issues. Except for the issues of combination electric and gas companies, they did not, however, decline nearly so far at the end of 1933 as the other issues. Furthermore, their recovery from this point on was more rapid than any of the other issues.

The analysis of the market experi-

TABLE NO. 1. REVENUES FROM SALES TO CUSTOMERS (1929-1938)

(Millions of Dollars)

Year	Electric Light and Power	Gas	Telephone (Bell Companies) (Local and Toll Service Revenues)
1929	$1,938	$785	$1,045
1930	1,990	797	1,076
1931	1,975	768	1,049
1932	1,813	723	933
1933	1,754	682	841
1934	1,831	701	850
1935	1,911	727	899
1936	2,044	767	971
1937	2,180	800	1,024
1938 (Estimated)	2,172	786	1,024

TABLE NO. 2. DISTRIBUTION OF COST TO INVESTOR OF PUBLIC UTILITY OPERATING AND HOLDING COMPANY BONDS BY TYPES OF SERVICE (DEC. 31, 1936)

	Number of Companies	Number of Issues	Cost to Investor (Millions of Dollars)	Per Cent
Electric	129	342	$4,089.8	67.4
Gas	31	58	396.5	6.5
Gas and Electric	49	131	1,206.7	19.9
Electric and Traction	8	17	178.8	3.0
Gas, Electric and Traction	6	18	191.9	3.2
TOTAL	223	566	$6,063.7	100.0

TABLE NO. 3. PER CENT PROFIT OR LOSS ON PUBLIC UTILITY BONDS BY TYPE OF SERVICE FOR SELECTED DATES (1929-1936)

Date	Electric	Gas and Electric	Gas	Elec. and Traction	Gas, Elec. & Traction	Total
Sept. 20, 1929	— 2.2	+ 0.7	— 3.1	— 2.1	— 3.6	— 1.7
Dec. 31, 1930	— 1.2	— 2.1	— 4.5	— 2.3	— 2.5	— 1.7
Dec. 31, 1931	—16.2	—15.5	—21.7	—18.5	—21.4	—16.6
Dec. 31, 1932	—15.6	—12.4	—15.2	—22.1	—26.9	—15.3
March 1, 1933	—20.4	—16.4	—18.8	—26.0	—35.8	—20.0
Dec. 31, 1933	—29.9	—21.9	—24.3	—34.0	—43.5	—28.1
Dec. 31, 1934	—15.0	—10.2	— 9.4	—15.1	—29.7	—13.9
Dec. 31, 1935	— 2.3	+ 0.6	— 0.4	— 4.9	— 5.1	— 1.7
Dec. 31, 1936	+ 1.3	+ 2.0	+ 2.2	+ 0.5	+ 5.6	+ 1.6

ence of public utility bonds from 1929 to 1937 as compared with that for other groups of bonds indicates that the record of electric and gas operating company bonds was distinctly better and further that the record of utility holding company bonds was relatively better than the other groups of bonds.

An analysis of public utility operating and holding company preferred stocks by types of service showing the per cent profit or loss over the same period reveals that except for a sharper decline it follows the same general pattern as outlined above with respect to public utility bonds.

Dividend Record

A survey of interest paid on public utility operating and holding company bonds for the years 1930 to 1936 indicates that the record of interest payment has been very good and that the experience of gas utility companies within this group compared favorably with all other utility companies.

In a study of the income record of public utility preferred stocks, Jules Backman in the January, 1939, issue of *Trust and Estates* arrives at the following conclusion: A comparison of the dividend experience of public utility gas and electric operating companies with that for other industries for the years 1933 and 1936 indicated that the record of dividend payments of electric and gas operating company preferred stocks was much more favorable than industries other than food and tobacco. These latter two industries reflected a high degree of stability in their dividend records and their record was about the same as that for public utility gas and electric operating companies.

A comprehensive analysis of receiverships for the years 1931 to 1936 has been compiled by Dean Madden and Dr. Dorau. This study shows that the receivership record with respect to electric, manufactured gas, and natural gas operating companies during the period under review was remarkable.

Manufactured gas operating company capitalization involved in receivership amounted to 2.4 per cent of the capitalization. That of electric operating companies amounted to 1.6 per cent of the fixed capital of the industry, while that of natural gas operating companies amounted to 6.4 per cent of the fixed capital of the industry. Involved in receiverships or defaults were 21.7 per cent of railroad capitalization despite the assistance of the Reconstruction Finance Corporation.

The data for foreign securities shows 38.5 per cent in default, real estate securities 61.7 per cent in default, and municipal securities five to 10 per cent in default. These, however, are not strictly comparable with the records for public utilities and railroads since the one deals with default while the other is concerned with receiverships. The comparison does, however, give a fairly good indication of the relative status of these types of securities as compared with securities of electric, manufactured gas, and natural gas companies.

The Industry's Future

The investment merit of the securities in any industry, obviously, is primarily dependent upon the status and future of that industry. The gas industry today faces the future in a sounder and stronger position than at any time during the past decade. During the past few years the industry has developed new vitality. While significant increases have been recorded during recent years in commercial, industrial, and house heating sales an even more important development occurred in the year 1938 during which residential sales, the base load of the industry, reversed their downward trend. For the first time since 1930 sales of manufactured gas for domestic purposes, which had suffered from adverse economic conditions, competing services and a change in customer usage, showed an upturn amounting to 1½ per cent and this upturn has continued with increasing momentum during the current year.

Despite a general business decline the manufactured gas industry expanded and progressed during 1938. Over 17,100,000 customers were served by the entire gas industry during the year, the largest number ever supplied with gas, representing an increase of 180,000 over those served in 1937, a year of much higher business activity. Total manufactured gas revenues and sales increased over two per cent, while at the same time the revenues of

(Continued on Page 37)

An 11 M c.f. per Hour Burner with Automatic Temperature Control

By E. L. KELLS
Southern Counties Gas Company
Los Angeles, California*

A PROBLEM recently faced by the Southern Counties Gas Co. was the construction of a burner with automatic control to vitrify clay in a 5 ft. x 60 ft. rotary kiln. Temperatures maintained were to be up to 2300° F. and gas input up to 11 M c.f. per hr.; maximum gas pressure, 1 lb. per sq. in. Restriction of the area permissible to fire through the hood of the kiln made the atmospheric burners first used a failure because of poor control of flame length, atmosphere, zone of vitrification and temperature.

The burner and control system were constructed as shown on the schematic sketch, Fig. 1. The burner consisted of a 6-in. torpedo, D, with 10 helical vanes welded to it (two vanes shown on Fig. 1), centered in a section of 10-in. pipe tapering down stream to a 6-in. nozzle. One hundred orifices were drilled in the torpedo in staggered rows between the vanes as shown on the sketch. Gas was fed to the torpedo by two 2-in. pipes. These two pipes formed a horizontal axis about which the burner could be rotated to elevate or depress the nozzle, thus throwing the flame to the top or the bottom of the kiln. Bearing surfaces between the burner and the 2-in. pipes were the threaded joints where the pipes went into the collars welded to the torpedo and the packing glands where the pipe passed through the 10-in. casing. These two gas supply pipes were brought upward through ordinary elbows and then through other elbows brought toward each other and welded into a 3-in. vertical line which was supplied from the gas section of the proportioning valve. A simple thrust bearing supporting the 3-in. pipe made it possible to rotate the burner in a horizontal plane and throw the flame to either side of the kiln. These adjustments were thought necessary to break up mud rings forming in the kiln and to facilitate movement of the hot zone. An 8-in. air supply line was brought from a blower capable of delivering 200 M c.f. per hr. at 7 oz. pressure. This air line was run through the air valve of an 8-in. x 3-in. North American air-gas proportioning valve (rotating plug type, F) and thence to the burner. A canvas sleeve, E, joined the air pipe and the burner to allow changing of their relative positions as the burner was aimed. A 3-in. gas line fed gas to the proportioning valve and then through a swivel joint to the 3-in. vertical pipe feeding the burner. A thermopile, C, was aimed at the hot zone of the kiln through a 6-in. opening in the hood. This actuated a "Micromax" controller, A, which energized a motor, B, turning the proportioning valve. Changes of the air-fuel ratio are accomplished by moving the section H of the proportioning valve core to restrict the air flow.

Fear that the whirling of the gases as they left the torpedo and passed through the nozzle would throw them rapidly to the surface of the kiln made it seem advisable to put straightening vanes at J, as contact of the burning gases with the vitrified material would result in reduction. These straightening vanes so slowed the combustion by decreasing the turbulence that they were replaced with a screen, to prevent flash back, and the nozzle somewhat lengthened. This retained the turbulence necessary for high speed combustion, and the longer nozzle seemed to hold the flame in sufficiently for burning to be completed before the gases struck the wall of the kiln. To keep the nozzle from burning up, it was necessary to decrease the size to 6 in. from the 6½ in. as originally installed, thus making the flame burn off the nozzle and keeping it cool enough to prevent rapid deterioration. Dust rising from the vitrified material as it fell into the collection hopper directly below the burner formed an erratic radiation shield in front of the thermopile and interfered with its satisfactory operation until a dust removal system was installed, eliminating the trouble. A yellow flame pilot was installed just below the nozzle, but the duration of firing usually being a matter of months when once started, the lighting problem was not important.

The burner was found to be very versatile and would operate over a wide range of inputs and air-fuel ratios. Also, the hot zone in the kiln could be moved somewhat, a valuable asset enabling establishment of the

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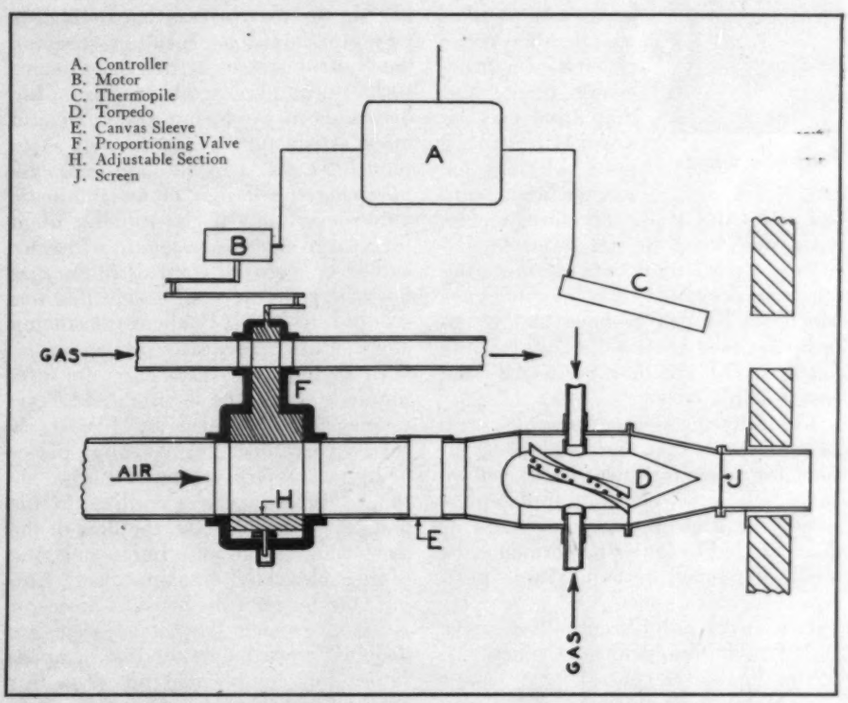

FIG. 1. An 11 M c.f. per hour specially designed burner with automatic temperature control for 2300° F. for application on an exacting rotary kiln job.

* Republished from the Pacific Coast Gas Association's Gas Utilization Data Bulletin No. 54.

CURRENT CONTROL

By HENRY N. WADE

President, Parkhill-Wade, Los Angeles*

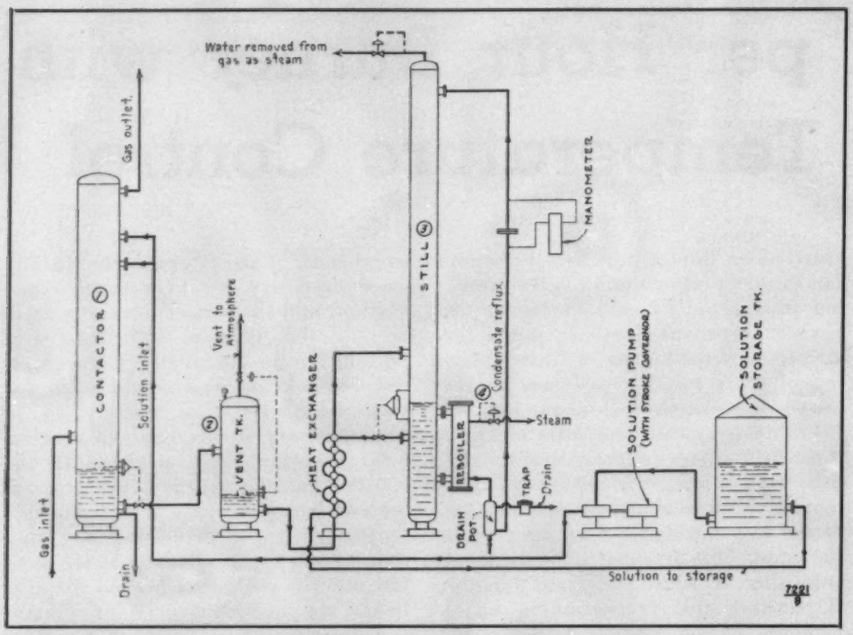

FIG. 1. The Stearns-Roger Manufacturing Co.'s Diethylene-Glycol dehydration plant, Kansas Pipe Line and Gas Co.

THE purpose of this paper is to give a short review of current practice in the application of automatic controls to various natural gas processing operations, primarily within the range of our experience. It should be emphasized from the beginning that control schemes are susceptible to perhaps more variation than any other element of a processing plant, and that there may be several equally good solutions for any particular control problem. It is, therefore, understood that when we get down to discussing particular operations, the schemes presented are merely ones which we happen to have used satisfactorily; they are not the only feasible schemes, nor are they necessarily the best possible ones.

HENRY N. WADE

The following simple principles seem so self-evident that there should be no need for repeating them here; yet we have all seen control applications where the neglect of one or more of them has led to faulty performance, or waste of money, or both. These principles are:

1. Control only essential functions.
2. Use the fewest devices which will secure the desired control.
3. Match the refinement of the control to the accuracy required.

The first step in designing a control system for a process is the laying out of the apparatus and connecting piping in the form of a diagram or "flow sheet," so as to indicate the functions of each element, and its functional relation to the others. All process controls are indicated on this diagram; study of the control system in this form will almost always develop ways of simplifying the system as originally conceived. Our own experience has shown that just as much time as possible should be spent in studying the control system at this stage, since such study almost always pays big dividends in producing a simpler and more satisfactory plant, as well as in reducing costs. I recall one recent case involving the design of an automatic butane-air mixture gas standby plant for a large city gas system in which we had seven essential controls in the first flow sheet; in the final design this was reduced to three, without sacrificing any operating advantages.

In laying out a flow sheet for preliminary study, the "straight line" arrangement, illustrated by Fig. 1, is easiest to follow. The essential pieces of apparatus are drawn in a row, arranged in sequence according to the main flow; in this case, the flow of the processing solution. Interconnecting piping naturally arranges itself simply; the longer runs between pieces of apparatus which are not adjacent are dropped down below the line of apparatus. For complicated processes this arrangement may become awkwardly long; two or more "straight lines" can then be placed one above another, as illustrated by Fig. 2.

It is understood, of course, that the flow sheet arrangement will bear little or no relation to the actual plant layout arrangement. The whole purpose of the flow sheet arrangement should be to make the diagram as simple to read as possible, to facilitate study looking toward simplification.

In order to bring out some of the points regarding selection of controls which we have learned from our own experience, I will follow through two actual plant flow sheets, covering somewhat unusual operations.

Fig. 1 shows a flow sheet for a diethylene glycol gas dehydration plant installed on a pipe line near Otis, Kan.

The solution contactor (1) is in a gas pipe line, hence no controls are desired for either the pressure or rate of flow of the gas, these functions being determined by the line operation. The diagram shows an internal float control to hold the solution level constant in the base of the contactor. Our tendency for the past several years has been to use internal level controls in preference to the external or "kidney" type for the following reasons:

1. They are not subject to freezing in cold weather.
2. With modern materials and workmanship, failures of the float practically never occur.
3. They are usually cheaper than the kidney type.

The glycol solution leaving the contactor carries a small amount of gas in solution, which is largely removed in the vent tank (2), in which just enough pressure is carried to deliver the solution through the heat exchanger into the still. This venting pressure control is accomplished by another internal float, which operates a valve on the vent gas. This is an application of general principle No. 2. Both a back-pressure regulator and a liquid level con-

*Presented before the Refinery Division, Oil World Exposition, Houston, Texas, April 24-29, 1939.

PRACTICES IN THE AUTOMATIC OF GAS PROCESSING OPERATIONS

troller might have been used on this tank.

The liquid level in the base of the still (3) is controlled by an external or kidney type float. The reason for the kidney float here is that the liquid in the base of the still is boiling violently all the time; the small connections to the float case damp out the surface disturbances and allow the float to ride smoothly, preventing excessive wear of the mechanism.

The use of a pressure-reducing valve (4) for controlling steam supply to the glycol still reboiler is an example of the application of general principle No. 3. The obvious instrument for this purpose is a temperature controller, such as might be used for a stabilizer reboiler. However, the heat load on the reboiler is practically constant, and the still base temperature is not important so long as it is high enough; therefore the simple and comparatively cheap scheme used controls the base temperature with sufficient accuracy.

The solution circulating rate is controlled by a standard make of pump stroke governor, another application of principle No. 3. This is a very small plant; hence the fuel which might be saved by proportioning the solution rate to the gas flow is negligible; therefore the stroke governor is set to deliver the maximum required rate and left alone. In a larger plant a ratio controller to proportion the solution rate to the gas flow might well be justified.

Fig. 2 is the flow sheet of the distillate extraction and gas pressure maintenance plant of the Corpus Christi Corp. The general scheme involves cooling the gas and distillate mixture which comes from the wells, separation of the distillate from the gas at as high a pressure as possible, return of the separated gas to the producing formation by compression, and stabilization of the separated distillate to 10 lbs. Reid vapor pressure. In order to prevent hydrate or freezing obstruction in the high-pressure part of the system, arrangements are provided to inject calcium chloride brine into the incoming gas. This brine is separated from the distillate just ahead of the stabilizer, is reconcentrated, and used continuously.

The main gas flow is from the producing wells (1), through atmospheric coolers (2), water separator (3), heat exchanger (4) and pressure-reducing valve (5) to separator (6). From the separator the gas passes back through the other side of exchanger (4) directly to the suction of the pressure maintenance compressors (7), and thence to the return wells (8). A back-pressure regulator (27), normally responsive to the wet gas pressure at the plant inlet, serves to blow excess gas to the air in the event part or all of the compressors are shut down, until the necessary producing well adjustments can be made, restoring normal pressure conditions at the plant inlet.

The distillate flows from the separator through three stages of weathering under controlled pressures in tanks (9), (10) and (11); in the last tank the brine is settled out and run off to the reconcentrating system. The stabilizer charge pump takes suction from this same tank. A temperature recorder-controller (12) can by-pass a small amount of hot gas around the coolers and exchanger, so as to maintain the exact desired temperature in the separator (6).

The elements of this process are very simple and conventional, but perhaps two of the safety provisions included warrant further discussion.

The first of these is the arrangement for protecting the compressors against liquid carry-over from the separator, in case a stoppage should occur in the distillate drain from it. The float in the separator operates a throttling type pilot which delivers a variable pressure to its controlled valve according to the position of the float. The liquid control valve on the separator is designed to open wide when the pressure on its diaphragm reaches, say, 5 lbs. per sq. in., which corresponds to normal high level position of the float. If the level should continue to rise, the float pilot will deliver an increasing pressure into its controlled pilot line; this increase serves to shut down the compressors in the following manner:

Fuel gas to the engines is delivered through a spring-closed diaphragm valve (13), which is normally held open by pilot pressure delivered through regulator (14) and emergency level valve (15). This same pressure also holds closed bleeder valve (16), which is a spring-opened single-seated valve of large capacity, arranged to

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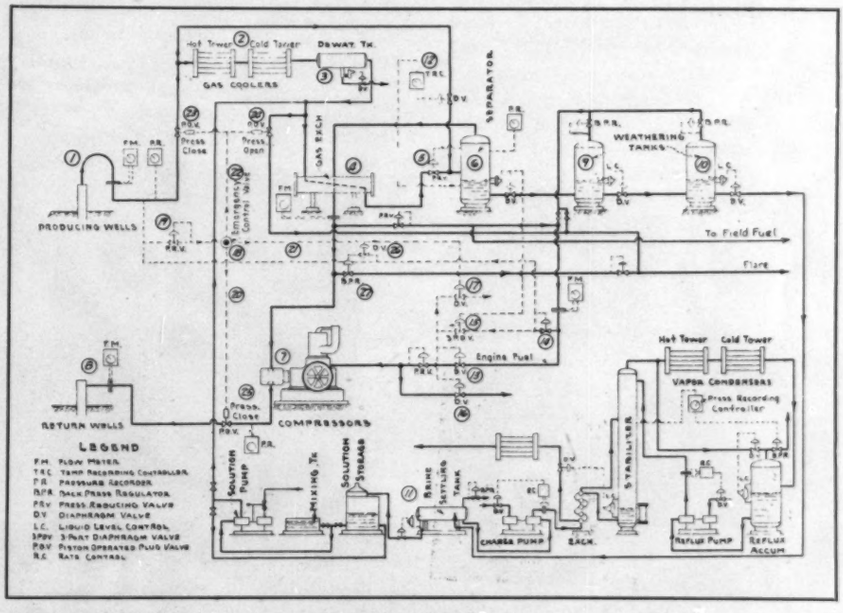


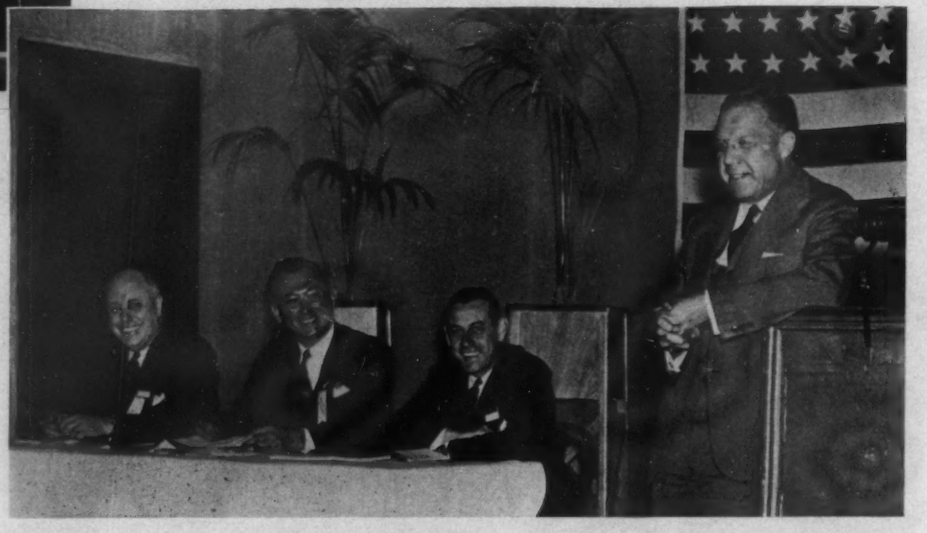
FIG. 2. Distillate extraction and pressure maintenance plant, The Corpus Christi Corporation, Corpus Christi, Texas.

GAS Camera

Manufacturers of gas appliances from all sections of the country attended the three-day annual convention of the A.G.A.E.M. in New York, May 24-26. The delegates above (left to right) are **John A. Fry,** president, Detroit-Michigan Stove Co.; **W. J. Barbour** of the same company; **W. E. Derwent,** Geo. D. Roper Corp.

E. R. Guyer, president of the Association of Gas Appliance and Equipment Manufacturers and vice president of the Cribben & Sexton Co., Chicago, opened the sessions of the Association's annual convention at the Roosevelt Hotel in New York City.

Random Snap Shots of Industry Personalities Taken in Action at the Recent Gas Conventions.



Some 200 members of the Industrial Gas Section, A.G.A., assembled at the Hotel, Restaurant- and Commercial Sales Conference held in Brooklyn, N. Y., last May. Above are Industrial Gas Section officials: **Eugene D. Milener,** secretary; **Frank H. Trembly, Jr.,** chairman; **Franklin T. Rainey,** vice chairman; **F. W. Lovejoy,** vice president, Socony-Vacuum Oil Company.

At the Production and Chemical Conference in Rochester, N. Y., last May were **Dr. G. E. Seil,** technical director, E. J. Lavino Co., Norristown, Pa., **A. S. Hall,** superintendent, Springfield Gas Light Co., Springfield, Mass.

Another attendant at the Production and Chemical meeting was **S. S. Tomkins,** laboratory manager of the Consolidated Edison Co. of New York, Inc., New York, N. Y.

R. S. Agee, sales promotion manager, A.G.A.E.M., urged greater participation in national promotion for the gas range division at the annual meeting of the Association held in New York, May 24-26.

Putting Color to Work

The Southern Gas Association Adopts a "Clean Up, Paint Up" Program for Plant Property Improvement

By J. A. MEACHAM

Pittsburgh Plate Glass Company

SOME industries have been particularly appreciative of the advantages of maintaining attractive plants. The textile industry, the various divisions of the food industry, and to a lesser extent the paper industry, have all surrounded themselves with an atmosphere of well-kept orderliness, which is a definite asset in their development of consumer good will.

In conversations with these concerns, it is impressive to note that such programs of property maintenance are considered not as an expense but, rather, as an economy.

That the Southern Gas Association has adopted a "Clean Up Paint Up" program for property improvement is an indication of resourcefulness and forward thinking, which augurs well for the future. Experience proves that those major subdivisions of industry which follow a consistent program of property maintenance and company identification through color are usually most successful in obtaining their share of the consumer's dollar.

Three-Fold Function

Paint has a three-fold function:

1. Advertising and good will value through improved appearance.
2. Improvement in lighting and seeing, with lower production costs and fewer accidents.
3. Protection of investment by reducing depreciation.

Ours is a world of color—in fact, man-made objects alone are the drab accents in the otherwise colorful and beautiful panorama of nature. There is fundamental soundness in the idea that color can and should be used for improving the appearance of industrial and utility plants.

Color accomplishes remarkable things. It contributes a pleasing beauty, focuses attention and adds interest to otherwise dull objects. Color alters apparent size, gives the impression of emphasis and suggests more or less weight. In the field of psychology, one color makes for cheerfulness; another for warmth; still another color will be exciting, while its counterpart will be modest and retiring.

On careful thought, we find that color tends to be essentially a mental sensation and not strictly a property of matter, for color, as we see it, may change, figuratively speaking, before our very eyes without alteration of the physical substance.

Actually there are but three primary colors—red, yellow and blue. These are usually illustrated in the form of a triangle, known as the primary color triangle. From them, all other colors can be made. If we mix blue and yellow, the result is green; red and yellow, the result is orange; and a mixture of blue and red produces purple.

By placing these mixed colors between each of the primary colors, there is obtained a secondary color triangle. This process of mixing may be continued indefinitely and the number of colors produced is endless. The three-color printing process illustrates this procedure admirably. Three impressions—one in blue, one in red and one in yellow—are superimposed, resulting in a full color reproduction of the subject, with a wide variety of color values possible.

Not all colors are equally attractive. Many tests of color preference have been made and although such tests are not entirely conclusive, it has been well established that men, as a rule, prefer blue and women prefer red; a mixed group will give its preference to red. Other colors are usually preferred in the following order.

Color	*Per Cent*
Red	32
Blue	26
Purple	18
Black	8½
Green, orange and yellow	6½

It is important to distinguish between color preference and attention value, which depends on a number of factors. First among these is color power. Colors such as yellow and red are known as advancing colors. They have a high interest value—a little goes a long way. Other colors, such as blue, are receding colors. For example, in a combination with receding colors, a small quantity of yellow will easily be the important color. It will appear to be standing out in front of the other colors.

Another factor in attention value is contrast. Red lines will present an indifferent contrast with low attention value on a dark gray background but vital, compelling contrast results when red is shown against a light gray.

One of the most interesting elements in attention value is the effect of continuity. Continuity can make a weak color srong; can push a receding color to the front.

S. G. A. Selects Aluminum

The Southern Gas Association, through its Committee to Promote Business Progress, has selected aluminum as the principal color for gas holders, tanks and exterior metal structures; red is to be used as the contrasting trim color. It is suggested that wood and masonry buildings be painted a light gray, likewise trimmed with red. The colors selected for motor vehicles conform to the general scheme for exterior painting, combining aluminum with red. These colors are considered highly practicable and well adapted to the conditions.

The Association slogan, "Use Gas for the Four Big Jobs," displayed prominently on gas holders, buildings and vehicles, will tie in effectively with the program of advertising and publicity.

In addition, the adoption of an identifying emblem would accomplish great things in plant identification and attracting public interest. Our suggestion would be a design consisting of the initials "S.G.A." in red on an aluminum or gray field, enclosed within a red circle, this emblem to be dis-

played prominently on buildings and equipment much in the same manner as our company uses its famous "Cover-the-Earth" emblem, which has proven highly successful. The name of the local utility printed under the emblem would complete the identification.

The value of white and light colored paints as aids to illumination is generally accepted and we consider it, therefore, in line with good practice to recommend white for the upper walls and ceilings in at least certain parts of your plants.

White paint improves the illumination in any room through its extraordinary ability to reflect and diffuse light. There are few known substances which reflect more light than a good white paint. It will actually reflect as much light as a mirror and much more than any colored paint. Furthermore, in its ability to diffuse and distribute light uniformly in all directions, a good eggshell finish can not be excelled. Better light means better morale, fewer accidents, and more economical operation.

Illumination Standards

There was a time when five to 10 foot-candles were considered adequate for nearly all manufacturing purposes and buildings were designed for that degree of illumination. In this as in other things, our standards have steadily increased. Ten foot-candles are now considered sufficient only for casual seeing. There are, undoubtedly, a number of locations in the gas plant where a high degree of illumination is not required, but we would suggest that 10 to 15 foot-candles should be considered the absolute minimum. For close mechanical and office work, 25 to 35 foot-candles would be in order.

The function of white paint in room lighting may be vividly demonstrated by a series of model rooms set on edge with a piece of semi-translucent white paper stretched across the open area representing the floor or working level. At the center of each room, a single 10-watt lamp provides the same amount of initial illumination in each case.

If the boxes are painted in different colors, the variation in the brightness of the paper will indicate the relative efficiency of the paint. Such a test proves conclusively the outstanding superiority of white in this regard and the numerical rating may be determined fairly accurately by the use of a sight meter placed with the cell directly against the paper front of the model rooms.

It will be found that a room painted in a shade of gray corresponding to the approximate appearance of an old and badly soiled wall will produce only about one-fourth as much light as the same room freshly painted white.

Incidentally, in this test a room painted entirely white produces nearly twice as much light as one painted with aluminum.

Yellow, cream and ivory paints are nearest to white paint in their light reflection value and, accordingly, give a higher level of illumination than aluminum, gray or green.

The effect of white paint on illumination has been substantiated by many surveys in industrial plants. In one instance, a survey showed 17 foot-candles of daylight illumination in the part of the plant painted white and only six foot-candles in the unpainted portion, although the construction of the building and other conditions were absolutely identical.

Accumulation of dirt is an important factor in any building, especially so in a gas plant. There is considerable experimental evidence to prove that an eggshell finish will accumulate considerably less dirt than a gloss finish. This type of finish is, therefore, recommended for all surfaces except those which are to be frequently washed, under which circumstances a gloss finish is required.

The suggested interior color scheme contemplates the use of white for walls and ceilings with a light gray dado, separated from the white upper wall with a black stripe. A dark machine tool gray has been selected for the equipment with levers and incidental apparatus black or red.

In selecting a color scheme for piping, the general recommendations of the American Society of Mechanical Engineers have been followed. They are: (1) *Red*—for fire equipment and sprinkler lines; (2) *Yellow and Orange Tints*—for dangerous lines; and (3) *Blue, Green and Gray*—for safe lines.

Standardized Program

It is not only important to use materials of good quality for maintenance painting, but it is essential to use the right material for a given surface. To this end, a standardized maintenance program such as is being adopted by the Southern Gas Association is of great assistance. Such a program simplifies the selection of materials, makes possible prompt deliveries with minimum inventory and is particularly useful in the supervision of the actual work.

A painting standardization has been prepared in booklet form. Complete recommendations are given for all surfaces, including exterior painting, plant interiors, plant equipment, offices and motor vehicles.

It is a relatively simple matter to determine from the index the proper standard paint for any surface. Full instructions are given for the use of each material and an estimate of the area it will cover per gallon on an average surface.

Actual color chips, illustrating all the standards, are included in the standardization booklet, with each color identified by number and the purpose for which it is to be used.

We are confident that as this standardized painting program is carried out it will result in material benefits not only to the members of the Southern Gas Association but to the gas industry as a whole.

■ ■

CALENDAR

August

A. G. A. Home Service Conference — Chapman Park Hotel, Los Angeles, August 22-26.

American Dietetic Association — Ambassador Hotel, Los Angeles, August 28-31.

Appalachian Gas Measurement Short Course — University of W. Va., Morgantown, W. Va., August 21-23.

National Association of Railroad and Utilities Commissioners — Seattle, Wash., August 23-25.

September

Gas Industry Day — Golden Gate Exposition, San Francisco, September 9.

Pacific Coast Gas Association — 46th Annual Convention, Fairmont Hotel, San Francisco, Calif., week of September 4.

October

American Gas Association — 21st Annual Convention, New York City, October 9-12.

Empire State Gas and Electric Association — Annual Convention, Westchester Country Club, Westchester, N. Y., October 19-20.

Gas Industry Day — New York World's Fair, October 9.

Midwest Industrial Gas Sales Council — Palmer House, Chicago, October 26.

National Metal Congress and Exposition — Chicago, October 23.

National Safety Council — Atlantic City, N. J., October 16-20.

McMahon Retires; East Ohio Co. Announces Promotions

John J. McMahon, vice president of the East Ohio Gas Co., Cleveland, has announced his retirement. During his service with the company, Mr. McMahon has held executive positions from pipe crew foreman to vice president and legal counsel.

Coincident to Mr. McMahon's retirement, the promotion of three men to executive positions was announced by C. E. Gallagher, president of the company. William G. Hagan, former assistant general manager, was named vice president and general manager. William G. Rogers, secretary-treasurer, was made vice president, and Peter F. Leusch, clerk, appointed secretary-treasurer.

Eliminating Gum Formers With Light Oil Scrubbers

• S. GREEN, The Brooklyn Union Gas Co., Brooklyn, N. Y. in a paper, "Light Oil Scrubbing for Gum Formers," presented before the American Gas Association Joint Committee Conference of the Production and Chemical Committees, Rochester, N. Y., May 22-24, 1939.—(Abstract by G A S).

THE Brooklyn Union Gas Co. supplies manufactured gas to approximately 750,000 consumers in the counties of Kings and Queens in New York City. The gas is produced in two plants, the Citizens Works, which manufactures carburetted water gas using heavy oil for enrichment, and the Greenpoint Works, a combination coke oven and water gas plant.

In 1930, modern gas appliances began to come into use in the company's territory, and shortly thereafter troubles were experienced with stoppages of pilot lights, needle valves, etc. With the increase in the number of new appliances in use from year to year, the number of these complaints continued to increase despite various steps taken to prevent their occurrence. A considerable portion of these complaints was attributed to gum. In the latter part of 1936, a large industrial consumer was inconvenienced by stoppages caused by gum. This particular case centered attention on the gum situation, and led to a decision to investigate the possibilities of removing the gum formers from the gas at the manufacturing plant by means of oil scrubbing. These stoppages were occurring principally in districts being supplied with gas by the Citizens Works, and laboratory examination of samples of this gum showed it to be of liquid phase origin. It was decided, therefore, to concentrate efforts at the Citizens Works and the investigation was started in 1937.

Two naphthalene scrubbers had been installed in this plant in 1933. These scrubbers are of the counterflow, tower type, 12 ft. in diameter by 40 ft. high. Each shell is divided into two vertical sections containing banks of wooden trays through which the gas ascends while being scrubbed by descending oil. A center compartment conducts the gas from the top of the first section to the bottom of the second section. The top of each section is equipped with 48 oil sprays which cover the entire horizontal area of the section with scrubbing oil.

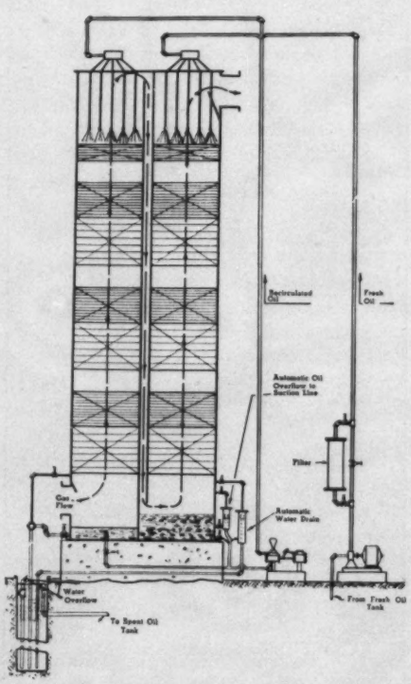


FIG. 1. Diagram of arrangement for light oil scrubbers.

Provisions were made on one scrubber for increasing the amount of scrubbing oil that could be used. A small tank was provided to receive the scrubbing oil from the bottom of the second section, so that any water could be removed before pumping the oil to the first section. A heating coil was installed in the fresh oil supply tank to control the oil temperature.

Alterations were next made to the equipment to permit the oil to be recirculated as many times as desired in the first or gas inlet section. The drain line from this section to the seal pot was altered to leave a reservoir of oil at the bottom of the section, and the suction line to the recirculating pump arranged so that it would take oil from the bottom of both sections.

A reciprocating steam pump of ample size was provided for the recirculating oil. Gage glasses were provided for the lower portions of each section so that the oil levels would be visible.

Finally, the tank for separating water from the oil collected at the bottom of the second section was removed and an automatic water overflow installed. An automatic oil overflow was installed at the bottom of the outlet gas section. This oil overflow prevented surges of oil from one section to another through the common suction line to the recirculated oil pump, which had occurred with changes in the gas pumping rate and had been caused by the change in pressure drop between the sections. Elimination of these surges prevented oil which had not yet been recirculated from by-passing directly to the seal pot. It also permitted a proper mixture of oil from the bottoms of both sections to be supplied to the recirculating oil pump. These overflows are shown in the diagram of the present arrangement of the scrubbers, Fig. 1.

Scrubbing for gum formers with recovery of the light oil at the Citizens Works has become a routine gas works procedure. It has been necessary to vary the scrubbing rate, a higher rate usually being required during warm weather when difficulty is experienced in cooling the gas to 80° F. Rates have varied from 400 gals. of debenzolized oil per million cu. ft. of gas during cold weather to as high as 650 gals. on very warm days. The light oil content of the spent oil from the scrubbers varies with the scrubbing rate. It has averaged 11 per cent in the summer months and 15 per cent in the winter months.

Since the spring of 1937, all gas manufactured at the Citizens Works has been scrubbed for gum formers, and the light oil removed from the gas has been recovered. With the small expenditure required for new equipment, this has proven to be a profitable undertaking. Throughout the remainder of 1937, a considerable amount of gum formers was found in the gas at the outlet of various storage holders due to the reabsorption of light oil which had condensed in the distribution system in the past. This condition delayed the time when the effect of scrubbing would be expected to show.

The large sale of modern appliances in recent years is rapidly increasing the number of these appliances in use. This fact would have an effect on the number of stoppages reported. Other factors complicate the situation, and to date the effect of scrubbing has not been great enough to permit a definite conclusion to be drawn.

However, there are certain indications that an improvement exists. The presence of oil condensate in the street drip has been eliminated. The use of tetralin locally in certain parts of the distribution system where gum stoppages had been prevalent prior to scrubbing has been discontinued without the recurrence of these stoppages. Stoppages in Electrolux refrigerators may be considered a good indicator as to the effect of scrubbing, as such stoppages are reported to the company.

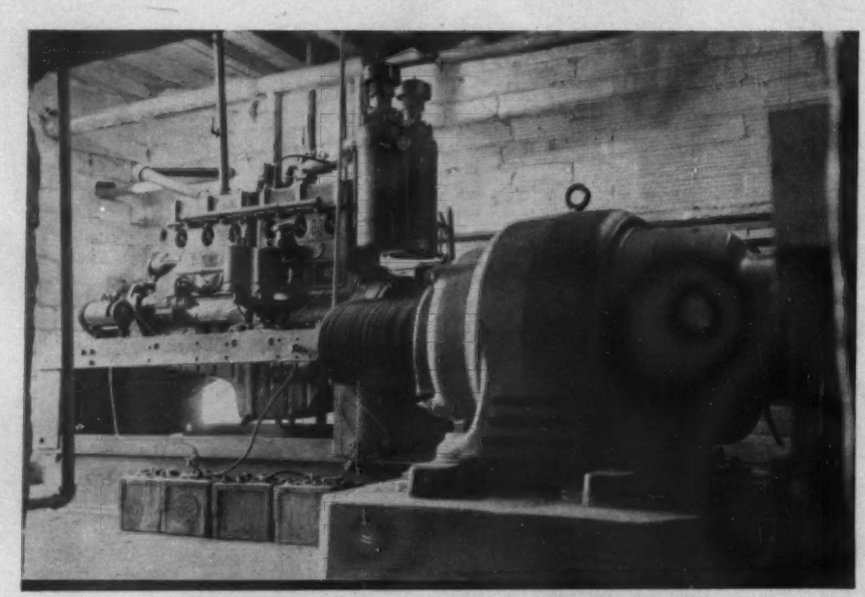


FIG. 1. A gas engine installed by the Sioux Falls Gas Co. to furnish power for the Sioux Falls Rendering Co. Note that the radiator is removed and that the generator is placed on a raised concrete foundation. A belt attached to this generator charges the batteries used in the company's trucks.

Facts and Figures on Selling Gas Engines for Power

• J. LEONARD LOVESETH, Sioux Falls Gas Co., Sioux Falls, South Dakota, in a paper, "Gas Engine Power in Sioux Falls," presented before the Annual Convention of the Mid-West Gas Association, Des Moines, Iowa, April 10-12, 1939.—(Abstract by GAS).

THE first gas engine installation in Sioux Falls, South Dakota, was made at the Sioux Falls Rendering Co. in the latter part of May, 1938. It consists of a 100-hp. gas engine, belt driving a 60 kw. generator with switchboard equipment including a voltage regulator, DC and AC ammeters and voltmeters for the exciter and alternator, and a watt hour meter. Power and lights are generated from this set-up. The pro-rated gas consumption for one year is 4,100,000 cu. ft., which will generate 132,500 kw. hrs. at a gas cost of 9.36 mills per kw. hr. In the second year this will be increased to almost seven million cu. ft. due to additional motors now in operation. The gross savings will be in excess of $3200 the first year, thus amortizing the total investment in 13 months. In the actual operating costs, as shown by the specimen monthly report, the cost of gas, oil, filters, and spark plugs have been included. There has been no repair expense to the customer up to this time. Oil consumption averages 8500 B.H.P. per gallon. The experiences had on this installation are typical and interesting.

Although the connected load on the generating equipment exceeds 100 hp., the load is such that until recently the load factor was only 35 per cent. This is due to the use of a 40 hp. grinding motor which operates only a few hours daily; another 25 hp. motor on a cooker, which operates continuously but has a heavy starting load; a 15 hp. intermittent water pumping motor, and several smaller motors.

Radiator cooling was found to be unsatisfactory. Due to the availability of unlimited river water, a heat exchanger was installed, and the water pumped from the river into an existing tank passes through the heat exchanger by gravity and then back into the river. It has been found that the optimum operating temperature of the engine water is 140°. In the winter months, water is circulated from a well for the cooling of the heat exchanger, and this tempers the water pumped from this well for plant use.

From the experience of engine operation in the South, it was learned that it is important to have the proper crank case oil for stationary engine applications. After considerable trouble with an oil first used, specification was changed to an industrial type, and the engine thereafter developed more hp. and operated more economically.

When the radiator was removed, one of the pulley bolts was connected to an automobile generator as shown in Fig. 1, and charges batteries for the trucks used for hauling. The manager of the plant has saved over $10 per month by this innovation. Operating costs were not credited with these savings.

The gas company also supply the boiler fuel at this plant. Until recently three of the four cookers have been operated by steam engines, but the heat balance has been off, and to correct this one of the steam engines was removed last month and a 25 hp. electric motor installed. This has corrected the heat balance on the plant and raised the load factor to over 50 per cent and decreased the gas cost per kw. hr. from 9.36 to 7.65 mills. This cost will further be lowered when the plant resumes 24 hour operation this summer. Another grinder is being added to this plant and a used automobile engine driven by natural gas is being direct-connected to it.

Table No. 1 is a specimen monthly report, showing all items of expenses and net and gross savings to date.

TABLE NO. 1. OPERATION OF GAS ENGINE GENERATOR

(February 26 to March 26, 1939)

Gas Used: 2,783,500 — 2,538,100	= 245,400
Kw. hr. Generated: (1487.5 — 1327.4) 60	= 9606 kw. hr.
Operating Hours:	= 390
Average Load Factor	= 51.2%
Cu. ft. per kw. hr. $\frac{245,400}{9606}$	= 25.5
Cost of gas: 245.4 × $.30	= $ 73.62
Cost of oil: 28 × $.15	= $ 4.20
Oil filter cartridges: 2 × $.80	= $ 1.60
Total cost, oil, gas and incidentals	= $ 79.42
Maintenance, depreciation, insurance, tax, and repair reserve	= $ 24.00
Cost of purchased power would have been 9606 × .03	= $288.18
3% tax on $288.18	= $ 8.65
3% tax on $ 79.42	= $ 2.38
Savings on tax	= $ 6.27
Total cost gas engine power: Gas and oil, $79.42; plus tax, $2.38; plus reserve, $24.00	= $105.80
Total cost of purchased power: $288.18 plus $8.65	= $296.83
Gross savings: $296.83 — $81.80	= $215.03
Net savings: $296.83 — $105.80	= $191.03
Net savings to date: $1,710.04 plus $191.03	= $1901.07
Gross savings to date: $1,934.21 plus $215.03	= $2149.24

NOTE: In April, 1939, another 25 hp. electric motor was added to improve heat balance, which increases load on gas engine generator.

• **Published on these pages are excerpts from the American Gas Association, Industrial Gas Section Interim Bulletin No. 1-CR, "Penetrating the Commercial Refrigeration Field." This bulletin was issued by the A.G.A. Commercial Refrigeration Committee, ROY P. WILSON, The Philadelphia Gas Works Co., Philadelphia, Pa., chairman. — Editor**

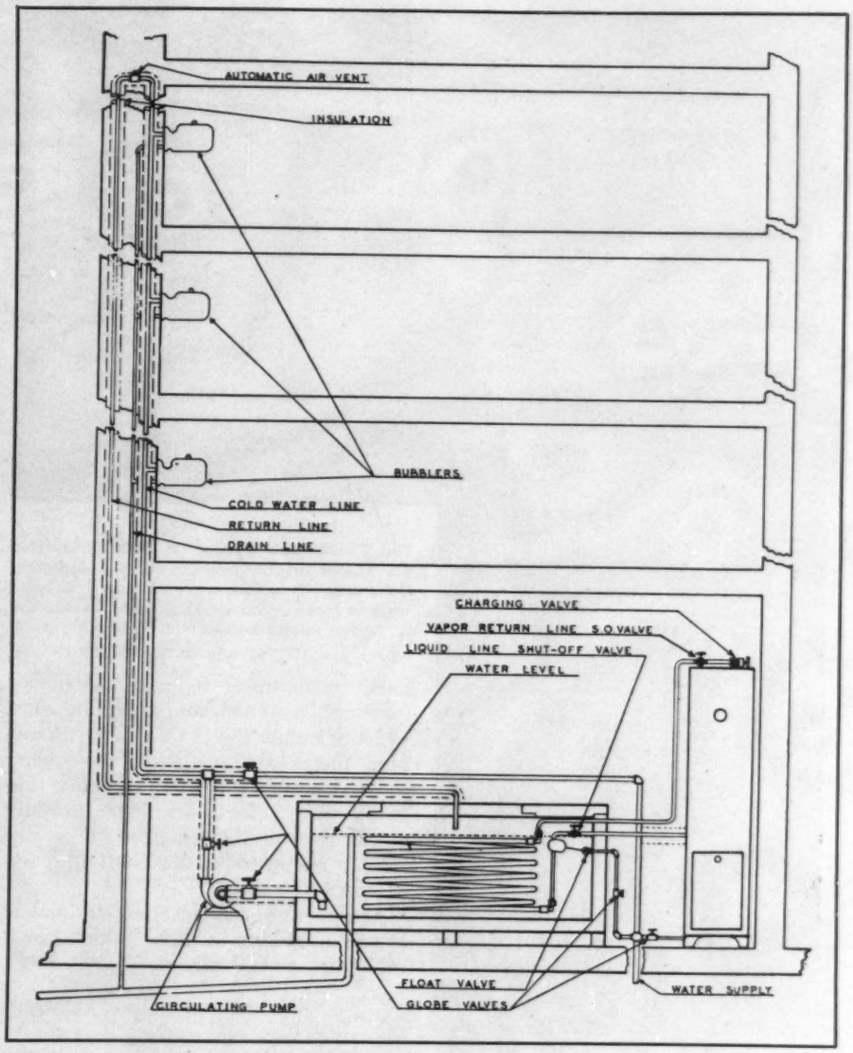


FIG. 1. Circulating water cooling system.

Penetrating the Commercial Refrigeration Market

COMMERCIAL refrigeration is of value to the gas industry because it opens up a new field for gas sales and assists in the expansion and retention of load in the older gas applications. It has ideal load characteristics. Also greater acceptance of domestic gas refrigeration and increased sales of domestic sizes will result from effort expended in this field.

Domestic gas Electrolux units up to 20 cu. ft. have been used in the commercial refrigeration field for about 10 years and a substantial number of these installations are still in use. Even today a fair percentage of the total sales of domestic type units are made in the commercial field, particularly in small restaurants and taprooms.

About three years ago several trial installations of the present design of commercial unit were made in Columbus, Ohio, and about a year was required to eliminate the usual troubles which develop in field applications of any new product. Promotional effort was started on the commercial gas refrigeration unit two years ago in several large cities in the United States, and, as the result of this experience, is it considered today to be ready for extensive selling effort. The acceptance and active merchandising of these commercial units should make possible the future application of this unit, with necessary modifications, to summer air conditioning.

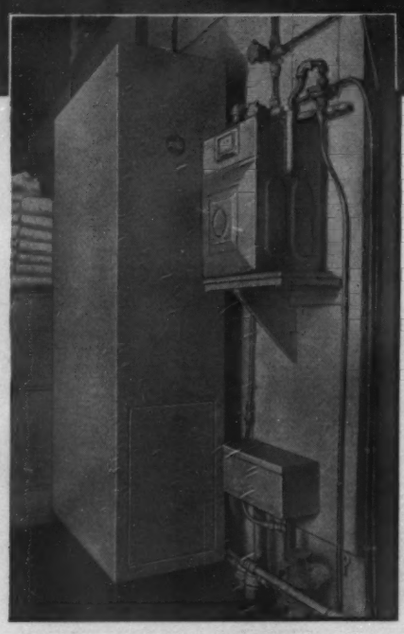
Commercial gas refrigeration units are water-cooled, similar in basic design to the original Electrolux household unit and are not, therefore, entirely new or experimental. The few differences are the result of necessary modifications for better adaptability to larger sizes necessary in the commercial field.

The refrigeration produced in the evaporator is not used directly but is transferred by means of a secondary system partly filled with liquid methyl chloride or some other suitable refrigerant. The evaporator then serves to cool the secondary condenser. Methyl chloride, a colorless liquid which boils at 10.6° F. below zero, is circulated from the unit evaporator as a liquid through the secondary evaporator located in one or more refrigerators at several remote points and returns as a vapor to the unit where it is again condensed to a liquid form by the unit evaporator. This cooling medium is used over and over, requiring no renewal as no deterioration or loss is experienced. It is supplied to the secondary system *free of moisture and oil.*

Controls: The gas control operates the burner full-on and full-off. This is necessary to permit a complete defrosting cycle of the secondary evaporators in the refrigerators and constitutes the second main difference between the household and commercial units. The safety pilot and high temperature cut-out are incorporated in the gas control design. Single and double ring ribbon type atmospheric burners are used for both natural and manufactured gas. The thermostatic water control is especially designed for economic use of water. Water does not come in contact with the sylphon bellows because it is separated from the water chamber by a housing. Gas and water pressure regulators and filters are part of the standard accessories furnished with the unit.

Secondary System Parts and Their Functions: The secondary system provides a means for cooling an insulated enclosed space located at one or more places at some distance from the unit. The means for conveying the cooling medium from the unit to the point of use requires certain additional equipment.

The transfer vessel is a mechanical



The CJ-652 unit shown (at left) refrigerates the 12-foot display case in Herb's Market in Columbus, Ohio (above), and also a 5x4-foot walk-in cooler. The unit is located beside the cooler on the main floor.

device designed to transfer the secondary refrigerant from unit evaporator level to any secondary evaporator located in a refrigerator at some remote point, usually at a higher level. No transfer vessel is required where gravity flow of secondary refrigerant can be arranged. Expansion valves are not required in the commercial gas refrigeration system.

The refrigerant liquid lines are of ⅜ in. O.D. insulated copper tubing. The refrigerant vapor lines are also copper tubing ½ in. O.D. on the two smaller units and ⅝ in. O.D. on the larger unit.

The surge tank is a vertical cylindrical receiver located in the refrigerator to receive and distribute the liquid refrigerant to the secondary evaporators. The vapor return line is also connected to the surge tank to permit vapors, as formed, easy access to the return line. The surge tank also functions as a reservoir for any excess charge of refrigerant which may be present from choice or otherwise.

The secondary evaporators are ordinarily made up of a continuous run of ⅝ in. O.D. tinned copper tubing onto which a number of 3 in. square aluminum plates .035 in. thick have been pressed and spaced at regular intervals of ⅓ in. to 1 in. apart. These evaporators are available in practically any size or shape to fit the cooling space of any refrigerator.

Commercial refrigeration equipment is now available in three models, with capacities as follows:

Model CH-502	500 lbs. I.M.E.
Model CJ-652	650 lbs. I.M.E.
Model CJ-1002	950 lbs. I.M.E.

I.M.E. is the abbreviation for ice melting equivalent and means that the unit will produce the same cooling effect as would be derived from melting, in 24 hours, the quantity of ice indicated.

	CH-502	*CJ-652*	*CJ-1002*
Outside dimensions (in.)	14¼x30¼ x64¼	same	14¾x30¼ x70¾
Flue gas outlet	3 in.	3 in.	3 in.
Shipping weight	560 lbs.	560 lbs.	635 lbs.
Net weight	450 lbs.	468 lbs.	535 lbs.
Input — Maximum (B.t.u. per hr.)	17,000	20,000	31,000

(Multiple units can be used on single large refrigerators)

Units of greater capacity are not immediately contemplated. Engineering research and study are being directed toward improved design to reduce operating costs, such as reduction in water consumption, without any great sacrifice in capacity; and the eventual adaptation of the principles of the present basic design to summer air conditioning.

An "Application Manual" has been published by Servel, Inc. From this tabulated data a quick solution of the problem to find the correct size unit to install can be obtained for approximately 70 per cent of the applications. The other 30 per cent will generally be of a special design, requiring the application of formulas which are included in the manual. Special cases should be referred to one of the manufacturer's field offices for solution.

It is recommended that the specifications of the manual be followed closely, as any deviations may lead to improper sizing of the equipment.

Refrigeration effect at remote points is provided with gas refrigeration under constant secondary pressure — therefore supplying better refrigeration than any type of electric compression refrigeration. The approach to "ideal" refrigeration for perishables is uniform temperature at the correct relative humidity. As no lubricating oil is necessary in the Electrolux system, flooded secondary evaporators are used with the result that uniform temperatures are maintained. Very small temperature differences between secondary evaporators and refrigerator temperatures make it possible to maintain the correct relative humidities.

This is a primary sales advantage for gas refrigeration and should be clearly explained and later demonstrated to a prospective user. The advantage of silence is of equal importance in the commercial field because over 50 per cent of the proprietors live on the premises.

Reliability of the refrigeration unit over a long week-end when the proprietor is away from the store is of decided importance because the failure of the unit at that time would result in a serious food loss. The electric compression unit is particularly vulnerable in this respect, since it ceases to function when the power fails or when the belt or internal parts break. Expansion valves on electric refrigerators are a constant source of trouble and it is of particular interest to note that they are *not* required for refrigeration by gas.

Preliminary estimates indicate that the maintenance on commercial gas units can be insured for approximately $12 per year.

This is in contrast with $25 to $45 per year, depending on the size and age, for insurance on electric refrigeration compressors. The compressor must also be in excellent running condition, otherwise it must be overhauled

at the customer's expense before insurance is issued. The maximum contract generally does not run over three years, at which time, if a renewal is requested, another overhaul will be necessary before the insurance is reissued. Eventually insurance is refused and a new compressor must be purchased.

Comparative operating costs can be calculated by using a ratio of 1 therm, to 4 kw. hr., to 120 lbs. ice, when units are operating at capacity. Any local rate studies that might be undertaken can be based on the above formula.

Typical establishments requiring refrigeration and the type refrigerator generally used are:

Large domestic	reach-in, walk-in refrigerator
Florists	reach-in refrigerator
Bakeries	reach-in refrigerator
Grocery stores	walk-in refrigerator, display case
Butchers	walk-in refrigerator, display case
Factories and offices	central ice water system
Undertakers	mortuary refrigerator
Eating and drinking places	reach-in, walk-in refrigerator and display case
Candy stores	display case

The apparent relative weight given to sales appeals are listed in order of their importance to the prospective purchaser: (1) initial cost, (2) operating cost, (3) service, (4) prestige of selling agency, (5) quality of product, (6) dependability of energy, (7) safety, and (8) noise.

The sale of commercial gas refrigeration should be assigned to the commercial or industrial sales division of the utility where it can be placed in a summer schedule to balance industrial and commercial space heating activities.

In some instances it may be necessary for the gas company to sell the complete installation, including refrigerator, and to sublet the installation contract to a qualified refrigeration engineer, who in turn will sublet the plumbing work to a registered plumber. The installation of gas, water, drain, and flue connections can be done by either a registered plumber or the gas company, and the secondary system can be installed by a qualified refrigeration engineer or the gas company, depending upon the policy of the individual gas company.

Servicing of the gas commercial units and secondary systems should be done by gas company service men who have had several years' experience with domestic gas refrigerators and who have received special training under the manufacturer's commercial refrigeration engineers.

Recording the Combustion Characteristics of Gases

W. J. HUFF

A. R. T. DENUES

• **A. R. T. DENUES with WILBERT J. HUFF, department of chemical engineering, University of Maryland, College Park, Md., in a paper, "Mechanisms for Recording the Combustion Characteristics of Gases," presented before the Joint Committee Conference of the Production and Chemical Committees, American Gas Association, The Sagamore Hotel, Rochester, N. Y., May 22-24, 1939.—(Abstract by GAS.)**

THE qualities of gases that condition the results of their technical combustion are commonly referred to as "combustion characteristics." These characteristics determine in large measure both the safety and the efficiency of the utilization of gases as sources of heat. In industrial situations that afford opportunity for the control of important variables, this evaluation is approached through considerations of intensities of releases of energy in standard flames or flame-outputs. However, in the domestic utilization of gases the analysis is complicated by the relatively uncontrolled operation of variables such as pressure. The best approach here is generally conceded to be through measurements of the height of the inner cone of the Bunsen flame. This approach has, however, been materially hindered by the lack of any reliable means for recording the height of the inner cone. Two mechanisms that have been developed to meet this recording requirement are described in this article.

Flame is a conductor of electricity and marked differences exist in the electrical conductivity of the various parts of the Bunsen flame. In contrast to the conductivity of the gases in the upper zone of these flames, the unburned gas within the inner cone is an effective insulator. In normal flames, the change from a medium of low temperature, free from ionization, to one of high temperature with a high degree of ionization is exceedingly abrupt. The derivation of an impulse from these differences forms the basis of the mechanisms to be described. This is effected simply by fitting a burner with two electrodes, one in contact with the upper flame, and the other rising vertically from the center of the port. If a suitable difference of potential is applied between the electrodes, one may make or break a circuit through the flame by moving the vertical electrode across the boundary of the inner cone. With convenient differences of potential the currents obtained are of the order of a few micro-amperes, and must be amplified.

Several methods of amplification of the small flame currents are available but a single triode and a relay were used in this work. This amplifier consisted essentially of a resistance placed in series with the flame circuit and with the grid circuit of a triode. Interruption or completion of the flame circuit

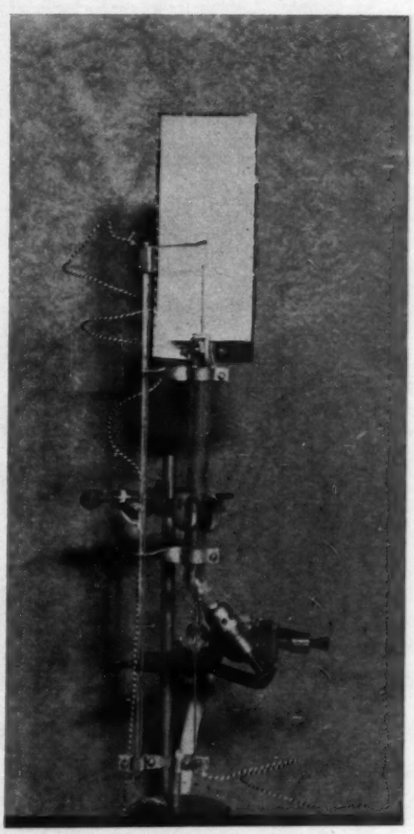


FIG. 1. Burner and movable assembly of electrodes.

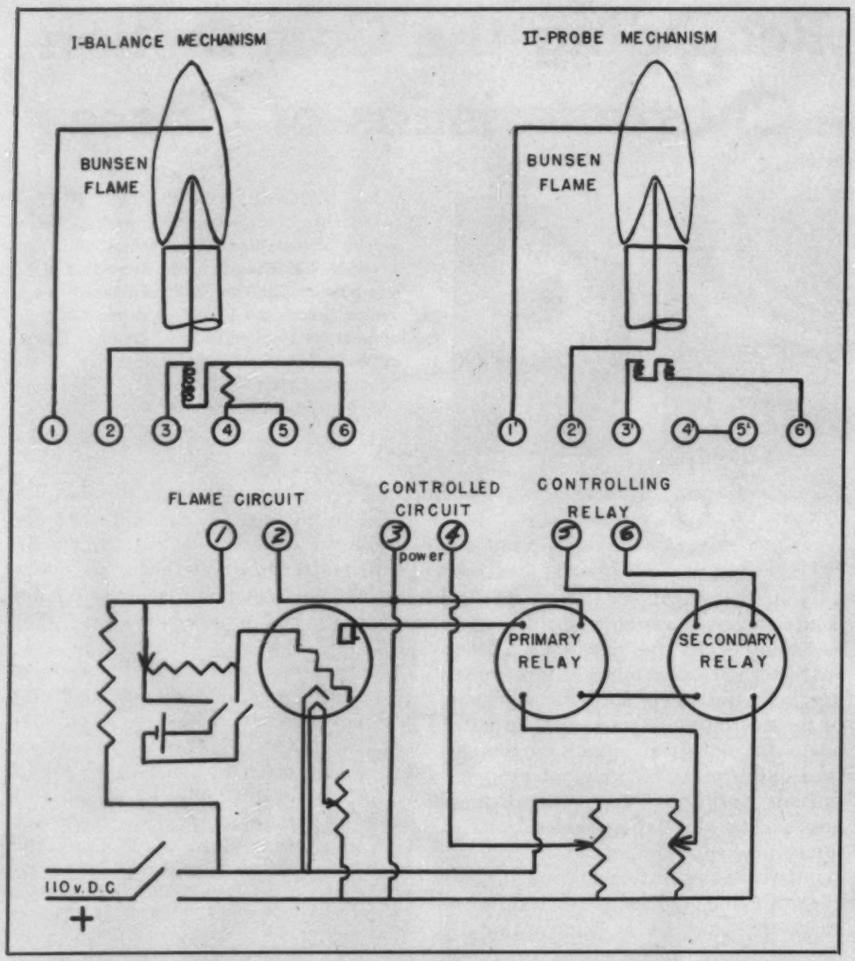


FIG. 2. Electrical connections. Alternative connections shown for (I) the balance mechanism and (II) the probe mechanism, with common amplifying and relay circuits below.

was thus reflected in a change in the grid bias in the tube, leading to a change in the plate current which was arranged to operate a relay. Details are shown in Fig. 2.

A movable assembly of electrodes was used in both cases; a photograph showing this assembly and the burner used is given in Fig. 1. The electrodes were of steel wire, and that rising from the burner was accurately centered by a guide of platinum, insulated from the flame.

Electrical Connections

A diagram of the electrical connections is given in Fig. 2. This diagram includes the amplifying arrangements common to both mechanisms and alternative connections for each.

In a first device, shown as "I" of Fig. 2, movement of the assembly of electrodes was effected by a magnet. The plunger of a solenoid was attached to this assembly and its position was governed as shown in Fig. 2 by controlling the current passing through the solenoid. Arrangements were made so that the pull of the magnet was greater or less than the weight of the moving assembly according to whether the flame circuit was broken or completed. This was accomplished by automatic control over a resistance in series with the solenoid windings, as indicated in Fig. 2. Oscillation of the moving assembly to keep the tip of the vertical electrode just below the flame front was therefore produced. A movement was thus derived, the peak of which corresponded at all times to the height of the peak of the inner cone. This movement may be recorded readily.

This device proved capable of indefinite continued operation in the laboratory. The moving assembly oscillated with an amplitude of approximately one-half in. and a period of approximately two to three cycles per second, with adjustments conveniently attainable. The apparatus was constructed so that the assembly fell immediately on contact of the rising vertical electrode with the flame.

In a later modification of this apparatus, shown as "II" of Fig. 2, a motor-driven crank mechanism which imparted a vertical reciprocating motion to the assembly of electrodes was substituted for the solenoid and plunger in the mechanism just described.

As reference to the diagram of Fig. 2 will show, the impulse derived from the flame by the passing of the vertical electrode across the flame front was used in this case to regulate the power supply to a small magnet carried on the moving assembly. The apparatus was arranged so that current flowed in this small magnet only when the vertical electrode was out of contact with the flame. An armature placed on guides below the magnet carried a pencil which moved over a recorder chart. This armature was thus carried vertically on each ascension of the assembly until contact of the vertical electrode with the flame caused its release, providing a record of the height of the inner cone.

Reliability Demonstrated

In continued operation, the armature fell immediately on contact of the vertical electrode with the flame front. Records prepared in the laboratory of the height of the inner cone demonstrated the reliability of the device and its faithfulness in following all variations in the height of the flame.

Acknowledgment is made of support from the Consolidated Gas Electric Light and Power Co. of Baltimore and particularly Dr. S. Karrer, director of the Research Department; patent rights for the devices described are the property of this company. Thanks are also due Dr. Ferdinand Hamburger and C. F. Miller of the Johns Hopkins University and Dr. D. T. Bonney of the University of Maryland for assistance in various phases of the work.

■ ■

Brooklyn Union Advances C. S. Goldsmith, W. H. Weber

Clarence S. Goldsmith has been promoted by the Brooklyn Union Gas Co. from the position of engineer's assistant in the distribution department to that of assistant engineer of distribution in charge of mains and service.

W. H. Weber, of the same company, has been appointed assistant engineer of distribution in charge of customers service. He was formerly being assistant to the vice president.

■ ■

Death Comes To F. C. Ingram

Frank C. Ingram, one of the pioneer employes of Southern California Gas Co., Los Angeles, passed away on May 23. A native of Macon, Ill., Mr. Ingram came to California and entered the employ of the City Gas Co. of Los Angeles in 1908. At the time of his retirement from active service in 1937 he was general superintendent, customers department, of his company.

The Accurate Determination Of Low Velocity Air Flow

• JOHN C. MUELLER, Payne Furnace and Supply Co., Beverly Hills, Calif., in a paper, "A Design of Laboratory Micromanometer," presented before the Technical Section of the Pacific Coast Gas Association at the Spring Technical Conference, Los Angeles, Calif., March 23 and 24, 1939. (Abstract by G A S.)

IN the measurement of low-velocity air flow by means of the pitot tube, a special problem in accurate determination of small pressures presents itself. As an example, an error of 0.001 in. equivalent water column in the velocity pressure reading at an air flow rate of 300 ft. per minute would introduce a 10 per cent error into the results. It is therefore obvious that a more sensitive instrument than the inclined draft gage, which reads directly only to 0.01 in. water column, must be used.

Two types of sensitive pressure measuring devices have been found suitable for work of this sort. The first, and the one still most commonly used, is usually referred to as the Wahlen gage. It employs two immiscible liquids of different specific gravity in a form of manometer, so that the application of a pressure difference results in a movement of the common meniscus between the two liquids by an amount equal to the ratio of the difference of their specific gravities as compared to the specific gravity of water. The inherent difficulty in such a gage lies in finding two immiscible liquids which will provide a satisfactory meniscus and which will not stick to the glass in the presence of each other.

The Micromanometer

The other type, covered by this article, and known as a micromanometer, makes use of a single liquid in a manometer, so arranged that one end of the tube may be raised or lowered with respect to the other, a micrometer being provided to determine the amount of motion. The pressure measurement is accomplished by noting the amount which the movable end must be moved vertically from the original position to bring the meniscus in this end back to its original location. By keeping the liquid in the same position in the apparatus at all times, errors due to irregularities in the shape and slope of the tube, and to capillarity, are automatically eliminated. By using a very large liquid surface in the stationary end, as compared with that in the movable end, drainage errors are eliminated.

The instrument described in this article, although basically the same as that designed by the American Gas Association Testing Laboratories, introduces some features which materially reduce its cost of manufacture. In addition, the convenience of reading is greatly increased by the use of Ames' dial for measurement of the vertical motion, and by the use of 20 rather than 40 threads per inch on the adjustments, a change made possible by the elimination of the micrometer screw. It consists of the following parts (see Fig. 1):

A base plate (A) 16 by 8 in., of 3/8 in. brass stock, mounted on three leveling screws, having their ends tapered to a point in order to prevent lateral movement of the instrument when the screws are turned. This base is sufficiently heavy to give the necessary stability to the instrument. At one end of the base is mounted a cross-test level (B), a stock hardware item.

The support column (C) extends 8 1/8 in. above the base plate and is tightly secured to the plate by two large nuts, the upper one of which (D) may be seen in the cut. It is essential that these nuts and the thread on the lower end of the column be true so that the axis of the column is normal to the base plate. Thus, when the base plate is leveled, as indicated by the cross-test level, the support column will be vertical. The column is made from a 9 in. length of 1 1/4 in. diameter brass rod, bored out to form a 3/4 in. I.D. tube. Tubing having these dimensions is not a stock item, so that the boring operation is necessary. A keyway (E) 3/8 in. wide and 5 1/4 in. long is cut through the wall of the column, with its lower end 1 5/8 in. above the base plate.

The leveling column (F) consists of a 10 in. length of 3/4 in. brass rod, 3 in. of the upper end being threaded 20 to the inch. A 3/8 in. keyway 3 7/8 in. long is cut into the side of the column, the top end 3 3/4 in. below the top of the leveling column. This leveling column should be designed to slide freely, but without excess play, inside the support column. It is raised and lowered within the support coldmn by the leveling nut (G) which rests on the hardened steel washer (H). Flake graphite makes a satisfactory lubricant for these moving parts.

The liquid-carrying portion consists of a reservoir (I) blown from 2 in. diameter Pyrex tubing. Its length is 3 3/4 in., and its center is 3 3/4 in. above the base-plate. A stub (J) is provided into which a room temperature thermometer is sealed by means of a short length of rubber tubing. This stub is also used for filling the instrument. The reservoir communicates with the reading tube (K) of 7 mm. O.D. Pyrex tube, by means of a length of 1/4 in. I.D. heavy-walled synthetic rubber tubing (L) which permits the necessary motion.

Reading Tube

The reading tube is supported on a ring (M) which is in turn attached to a plate supported through a 3/8 in. square brass key (N) to the leveling column (F). Slots are provided in the ring by which the reading tube may be supported at various angles with the horizontal in order to increase or decrease its sensitivity. For most work on which a gage of this type will prob-

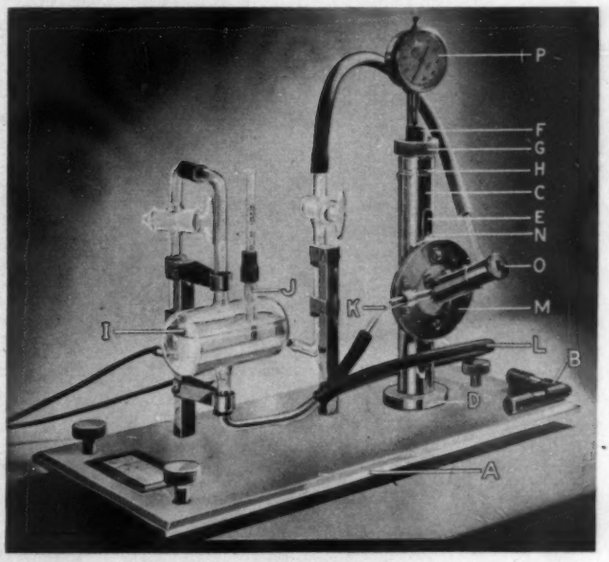


FIG. 1

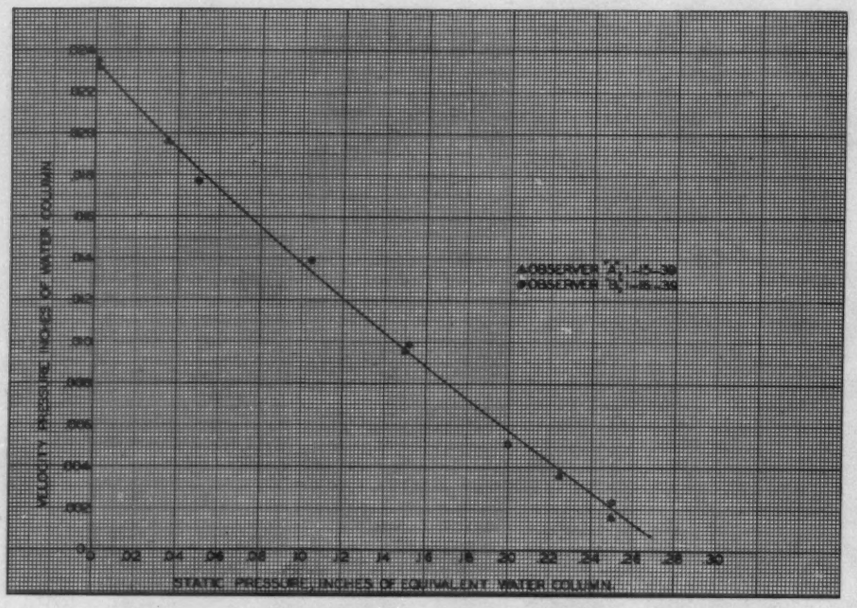


FIG. 2. Comparison of results obtained by two observers using micranometer.

ably be used, however, an angle of 3 degrees with the horizontal provides the desired degree of sensitivity, so that this adjustment may be eliminated if desired. The key (N) should make a good fit with the keyway in the support column (C) to prevent sidewise rotation of the moving parts when the leveling nut is turned.

An etched crosshair is provided on the reading tube, and a thermometer magnifier (O) is used for greater accuracy. The surface behind the tube is painted flat white to provide greater ease in reading.

Pressure connections are made to the top of the reservoir and to the upper end of the reading tube through three-way Pyrex stopcocks of 4 mm. bore, supported by clamps to posts of ½ in. square brass rod, tapped into the base plate and secured by locknuts beneath the plate. The right-hand stopcock communicates with the reading tube through a loop of ¼ in. I.D. heavy-walled rubber tubing, providing a flexible connection.

Dial Gage

An Ames dial gage, reading directly to 0.001 in., is mounted to the support column by means of a clamp and set-screw. The spindle bears on the top of the leveling column, and registers its vertical motion with respect to the remainder of the instrument.

The liquid used is absolute methanol. This can be purchased in a sufficiently pure state and its specific gravity may be accepted as standard. In addition, it has a very low viscosity and fairly high refractive index, so that it drains from the glass readily, responds to pressure changes quickly, and provides a satisfactory meniscus. A table of specific gravities at various temperatures is attached to the base plate of the instrument.

The entire instrument, with the exception of the threads on the leveling column and nut, is chromium plated. In machining the keyways in the support and leveling columns, the thickness of the plating, about 0.0005 in., must be taken into consideration.

Connections to the pressure tappings or pitot tube are made, the base plate is leveled, and the stopcocks are turned so that the two ends of the liquid column communicate with the atmosphere through the axial bore in each cock. The leveling nut is turned until the meniscus in the reading tube, as viewed through the magnifier, touches the hairline. The dial of the Ames gage is then loosened, and the zero brought to the pointer, after which the dial is again locked.

The stopcocks are then turned to the position shown so that the pressure to be measured is applied to the two ends of the liquid column. The leveling nut is then turned to raise or lower the reading tube, until the meniscus is again at the hairline. The amount of movement, which is a measure of pressure applied in inches of methanol column, is read directly from the Ames dial. This is converted into inches of equivalent water column by multiplying by the specific gravity of methanol at the temperature shown by the thermometer.

As noted above, the dial gage used is direct reading to 0.001 in., and permits estimation to 0.0001 in. A zero reading on the instrument may be consistently reproduced to within 0.0005 in. even by operators who are entirely unfamiliar with it. As viewed through the magnifier, a vertical movement of 0.001 in. produces an apparent shift in the meniscus of 1/16 in.

Results Obtained

As an example of the extreme reproduceability of results, a curve (Fig. 2) is shown on which is plotted the results obtained by two different observers, on two different days, in the measurement of air delivery on a winter air conditioner at various static pressures. Observer "B" had never previously used a micromanometer, and was unaware of the results obtained by observer "A" a day earlier. Yet the greatest deviation of any observation from the average curve was 0.0006 in. equivalent water column, amounting to an error of less than 10 ft. per minute at a velocity of 540 ft. per minute.

Many details of this instrument were suggested by a micromanometer built by the Pacific Coast Branch of the American Gas Association Testing Laboratories. Special acknowledgment should be made to F. O. Suffron, supervisor of the Pacific Coast Branch, for his suggested use of an Ames dial gage, rather than a micrometer screw, for measuring the movement of the liquid column.

■ ■

Panhandle Eastern to Supply Natural Gas to Ohio Towns

Panhandle Eastern Pipe Line Co., Kansas City, Mo., has recently signed a long-term contract to supply natural gas to the Ohio Gas Light and Coke Co., Bryan, Ohio, for service to the towns of Bryan, Edgerton, Napoleon, Montpelier, Wausseon, Pettisville, Archbold and Stryker. These Ohio towns have been changed over from manufactured to natural gas by the Ohio Gas Light company.

Under the contract, natural gas service is to begin immediately, and continue until December 31, 1951. At that time the contract may be extended until 12 months' notice is given by either party.

■ ■

Nebraska Co. Shifts Manager

R. A. Pearson, local manager of the Nebraska Gas Co. at Shelton, Gibbon, Wood River and Kenesaw, Neb., has been transferred to Hebron, Neb., as manager of the company there.

Howard H. Hallon succeeds Mr. Pearson at Shelton.

■ ■

Joseph J. Schubert Dies

Joseph J. Schubert, district manager at Warrensburg, Mo., for The Gas Service Co., of Kansas City, passed away on June 15, after an illness of 10 days. He had been with the company for 27 years.

What it Takes to Build the Gas House Heating Load

• **D. R. FAULKNER, Seattle Gas Co., Seattle, Wash., in a paper, "What It Takes to Build Gas Load in Gas House Heating," presented before the Annual Northwest Conference of the Pacific Coast Gas Association, in the auditorium of the Seattle Gas Co., Seattle, Wash., June 22 and 23, 1939.—(Abstract by G A S).**

IN 1935 the Seattle Gas Co. was faced with the problem of building its house heating load. In the preceding years the company was averaging between 50 and 75 heating installations of all kinds. At that time the heating rate was considerably out of line with competing fuels so far as fuel cost alone was concerned. In 1934, 64 heating installations were made. In 1935, 395; 1936, 574; and in 1937, 728 installations. Since that time both volume and load have been increased.

To accomplish these results the management after a careful survey of the situation developed a combination stepdown optional heating and domestic rate directly competitive to the then existing price of oil, the chief competitor. This type of rate has proved satisfactory. However, from a load building standpoint, a greater load can probably be obtained by a straight competitive heating rate which does not depend on the domestic load to bring down the cost of operation into the lower brackets.

In addition to the rate, a heating department was set up consisting of seven heating engineers, a supervisor and an architect and dealer contact man. These men were carefully instructed in the proper ways and means of making a heating survey. Two checks were made on the surveys—one by the supervisor and the other by the shop installation inspector. One of the most important features of any heating program is the proper selling of the appliances and a close check on the installation.

Separate Department

Some companies turn the sale of heating appliances over to the domestic men to sell along with their other units. It is the writer's belief that more sales will be made by the use of a separate department concentrating solely on heating.

Next in order comes the advertising. The campaign was started with a break on the rate, using newspaper copy, notifying present consumers, etc. This was followed by newspaper and billboard copy advertising the advantages of gas heat in conjunction with its low cost. All through the copy ran the theme—"Gas Heat Always Best—Now Cheapest." This slogan was adopted and a booklet prepared showing and proving why. This booklet before its introduction to the public had its premier showing before a meeting of heating and architectural engineers with the request that they disprove or object to any of our statements and findings. It has been most helpful as a contact piece to the trade. The company has been most successful in selling many of the leading architects in the city and acceptance of gas by them is gaining headway every day.

One type of billboard which created a great deal of interest was installed in the fall of 1936. These boards carried on them the number of heating units sold since the rate inception. To create the impression of the speedy acceptance of gas as fuel for house heating, the billboards were sniped every day, and the figures changed. Needless to say, it aroused interest. Some people even got to betting on the next figure to show.

Appliance Used

The appliances used in the campaigns were central warm air, boilers, floor furnaces, circulating heaters and conversion burners. The conversion unit was stressed for three reasons: (1) original low cost; (2) ease of installation; (3) its suitability to nearly all kinds and types of heating plants.

The campaign broke with a rental plan on conversion burners. Excellent results have been obtained in the use of this appliance. Although this unit is penalized 10 per cent in operating expense, there have been numerous installations whose orsat tests gave an operating efficiency comparable to the straight gas job. In addition the conversion burner enables the salesman to break the ice, and when a furnace not suitable to conversion is found it is a somewhat simpler matter to change the order to a straight gas appliance. This unit is one of the best load builders on the market, and if installations are properly engineered and installed, they are quite permanent.

Another load builder is the floor furnace. It provides low operating cost and is extremely adaptable. These two items, the conversion burner and the floor furnace, have been found to be the best load builders—61 per cent of our installation comprising units of this type.

Central units, besides their numerous advantages over competition, have one outstanding value that gets considerable business—zoning of units and adaptability to loads and conditions. A number of large orders have been taken on this one feature. One furnace to handle the main house—one for the bedrooms—one for the recreation room, etc. Competition cannot meet the price and as a rule hasn't the sizes to do the job properly.

Architects Sought

Last, but not least, the company seeks the support of architects, builders, and dealer. The architects and builders are most helpful, and if they are on the gas company's side of the fence, the new building load will be greatly enhanced. It has been found that a special contact man will gain better acceptance and far more sales than the heating man. Dealer promotion, in our experience, has been a secondary consideration in the early part of the program. This was necessarily so for it fell on the utility's shoulders to create a gas heating demand to be able to show the dealer where he can fit into the picture and make some money. This has been accomplished, and the company is now considering a dealer program.

As a summation, it is necessary:

1. To have a rate as competitive as the amount of load desired.
2. Develop and train a group of heating engineers.
3. Put the jobs in right. If this is done, they will stick.
4. Conduct an advertising program in an attention-getting, thought-provoking manner. (Numerous helps along this line are now being provided by manufacturers.)
5. Use your users—they are the best advertisers you have.
6. Do not overlook the conversion burner and floor furnace.
7. Develop the architects and builders—any expense in this connection is good advertising.

■ ■

Saunders Named Controller

Frank B. Saunders has recently been appointed controller of the Philadelphia Co., Pittsburgh, Pa., and subsidiary companies, to succeed C. S. Mitchell, deceased. Mr. Saunders joined the Philadelphia Co. in 1922 as general auditor.

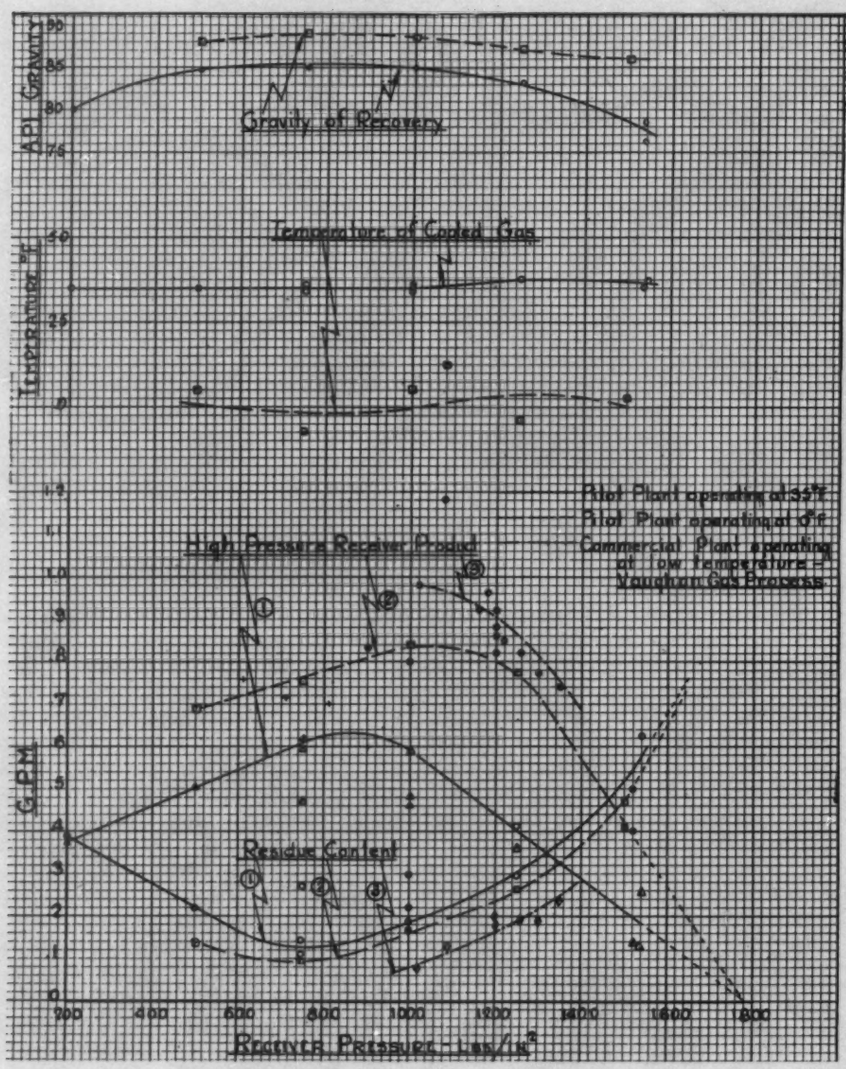


FIG. 1. Pilot plant operating at 35° F. Pilot plant operating at 0° F. Commercial plant operating at low temperature, Vaughan gas process.

Liquid Hydrocarbons From Recycled Reservoir Gas

• **WILLIAM H. VAUGHAN, Vaughan Gas Process, Incorporated, in a paper, "The Feasibility of Recycling Gas from High Pressure Gas Reserves," presented before the Annual Convention of the American Gas Association, Natural Gas Section, Tulsa, Okla., May 8-11, 1939.—(Abstract by G A S).**

THE recovery of liquefiable hydrocarbons of natural gas from comparatively high pressure reservoirs is now being accomplished as a result of the practical use of retrograde condensation. This is accomplished by cooling the gas sufficiently to condense the desirable constituents while reducing the pressure to a point within retrograde condensation range of the desired constituents at the reduced temperature. In some cases, the expansion of the gas from initial pressure to the final pressure may produce sufficient cooling to condense the desired constituents.

It has only recently been recognized by engineers that the so-called gas distillate reservoir products actually existed in the formation in the gas phase. The liquid product from wells located in such reservoirs has been referred to as "white oil" or "distillate." Both terms, in a general sense, are erroneous. The liquefiable hydrocarbons which may be produced from a natural gas, which is initially at a high pressure, by cooling the gas while reducing the pressure within the retrograde condensation range of the constituents at the reduced temperature are now properly referred to as "condensate."

Although the development program is comparatively new, seven plants are already in operation and four under construction. All of these plants are operated, or will operate primarily, on a cycle of cooling and reducing the pressure from the initial pressure to a point within the retrograde condensation range. The gas is either cooled by adiabatic expansion or by a combination of cooling refrigeration and adiabatic expansion.

Greatest Recovery

The greatest practical recovery of condensate from the formation can be achieved if the rate of flow from any point in the reservoir is so restricted as to result in the most effective utilization of the reservoir energy. This problem is similar to an oil production problem, and much engineering effort must be devoted to the exact determination of gas drive and adjustment of the flow to the most efficient or optimum rate.

Withdrawals from several properties should be in proportion to the available gas underlying each, and the gas returned to the formation should be in proportion to the withdrawals. Such a procedure will insure the optimum recovery of condensate. The actual pooling of leases in a single reservoir or unit operation gives an advantage over the sub-divided pool, and promotes the recovery and operating efficiency of a recycling or pressure maintenance undertaking, and will definitely lead to an improved economic balance.

The pressure at which the liquid is separated from the residue gas must be sufficiently high to economically facilitate the returning of the residue gas to the producing formation where the gas can be stored until it may be produced for the ordinary purposes for which dry natural gas is required.

A complex mixture of hydrocarbons under high pressure presents problems when heating or cooling hydrocarbons under high pressure. While there are considerable data available for the physical properties of pure components, there is a lack of data for mixtures of hydrocarbons existing at high pressure and low temperature.

The small pilot plant is, therefore, very useful in securing information necessary for the design of the larger commercial plant.

Fig. 1 shows the results of pilot

plant operation on a gas at a temperature of 35° as compared with an operation at lower temperature. The curves shown in this figure definitely show the retrograde condensation and retrograde vaporization pressure ranges at these temperature conditions. The receiver product curve and the residue content curve, No. 3, show the results of commercial plant operation at lower temperatures. Attention is particularly called to the fact that these curves definitely show that the retrograde vaporization points are extended to much higher pressure when the gas is subjected to a lower temperature.

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The Mass Market and the Space Heating Load

(Continued from Page 18)

stalled in a so-called parlor stove. Annual heating consumption for this group is up to 530 therms and over."

Following Mr. Quinn's analysis of this essentially "mass" market load, this is a good time to refer to the first article of this series (*G A S*, February, 1939) when we established the following average annual costs for the average American Family. (Table No. 5.)

It is interesting to see how these estimates work out in applying Mr. Quinn's load estimates in the three groups he classifies, to find out what average rate per therm would be necessary to get the business. (Table No. 6.)

Accordingly, and from an entirely different angle, we have a startling confirmation of Mr. Quinn's statement that (1) for fringe heating, the present cooking and water-heating rate will get the business, (2) for all-winter gas kitchen heating in conjunction with central heating by another fuel, a rate slightly lower than the average water-heating rate "but substantially above the level required for central heating" is adequate, and (3) for all-heating by the kitchen heater, the regular central heating rate will get the business.

In conclusion, it only remains to be said that our manufacturers have done their regular excellent job of providing appliances to meet the situation, and there is highly efficient equipment available for those who would like to go to work on this phase of better gasifying the "mass" market.

■ ■

Marcus, Iowa, To Have Gas

The city of Marcus, Iowa, recently voted to grant a 25-year gas franchise to the Peoples Natural Gas Co. of Sioux City, Iowa. H. E. Wedge, Wayne, Neb., represented the company in obtaining the franchise.

The company is building a main line from Sioux City to Minneapolis.

Gas Utility Securities

(Continued from Page 20)

many industries suffered declines ranging from 20 to 50 per cent.

The national advertising program, now in its third year, has been continued in harmony with an aggressive merchandising and sales promotional campaign. The results of this movement have demonstrated that the industry previously had not sufficiently publicized its development, the uses for gas, its superior efficiency, cleanliness, convenience, dependability and economy, and the tremendous strides recently made in the appliance field.

Gas for the four big domestic jobs —cooking, water heating, house heating, and refrigeration—offers the opportunity for one of the greatest advances in the history of the industry. The increasing public selection of gas as the fuel for the major household jobs is another indication of the preferred position of gas in the modern home.

The industry has recently completed a survey covering the utility characteristics of more than 104,000 one and two family homes constructed in 1938, this accounting for nearly 70 per cent of the entire number of one and two family homes built in the United States last year. For this group of more than 104,000 new and modern dwellings, of which 68,000 were located in the territory of natural gas companies, 88 per cent reported the use of gas for cooking, 74 per cent reported gas for water heating, 57 per cent used gas for house heating, while 12 per cent reported the installation of new gas refrigerators.

The amount and quality of research in all phases of the business is an outstanding achievement. Gas companies and manufacturers supplying the industry are engaged in extensive programs of development work. Revolutionary improvements have been made in ranges, water heaters, refrigerators, and other domestic appliances and further improvements are in prospect for the future. Commercial and industrial applications of gas are making notable progress. New developments in methods of producing higher B.t.u. manufactured gases, higher pressures, increased utilization of by-products, and improved efficiencies in gas production and distribution are on the horizon. Scientific investigation has not been confined to chemical and mechanical problems. Management is developing more effective rate structures, promotional activities, market analyses, cost analyses, and other aids.

The market for gas today is secure and the author is of the conviction that the field for gas in the home and industry will witness continued expansion. Let us examine briefly the principal segments of the gas market.

1. *Cooking.*—The modern gas range is more efficient, excels and out perform any of its competitors. During the year 1938 over one million new gas ranges were sold.

2. *Water Heating.*—Sales of 740,000 water heaters in 1938 exceeded previous years' sales while the sales of many non gas using major home appliances showed marked decreases.

3. *Refrigeration.* — Gas refrigerators continued their extraordinary public acceptance and relative sales results were better than other types of automatic refrigerators during 1938.

4. *House Heating.* — Manufactured gas sales for residential house heating increased every year throughout the depression, and in 1938 were almost four times the 1929 sales.

5. *Air Conditioning.*—The application of gas-operated absorption type direct dehumidification equipment as applied to the air conditioning field is making excellent progress. Air conditioning has been termed the nation's next great business. It carries a great opportunity for the gas industry.

6. *Commercial and Industrial Use.* —The increasing demand for gas in this field over the past nine years has increased almost 30 per cent.

Conclusion

The high rank attained by investments of the securities of soundly financed and well managed electric companies and combination electric and gas companies is well merited. From the facts presented, this position should be shared by the securities of soundly financed and well managed companies distributing manufactured gas, mixed manufactured and natural gas, and natural gas companies having reserves adequate to meet requirements for a long period of years.

It has been shown that the gas business has a frontier still to be developed and that it is in a sound competitive position for all the uses in which fuel can be utilized for domestic, commercial, and industrial purposes. The industry looks upon past achievements as mere stepping stones to the broader fields of service which lie just ahead.

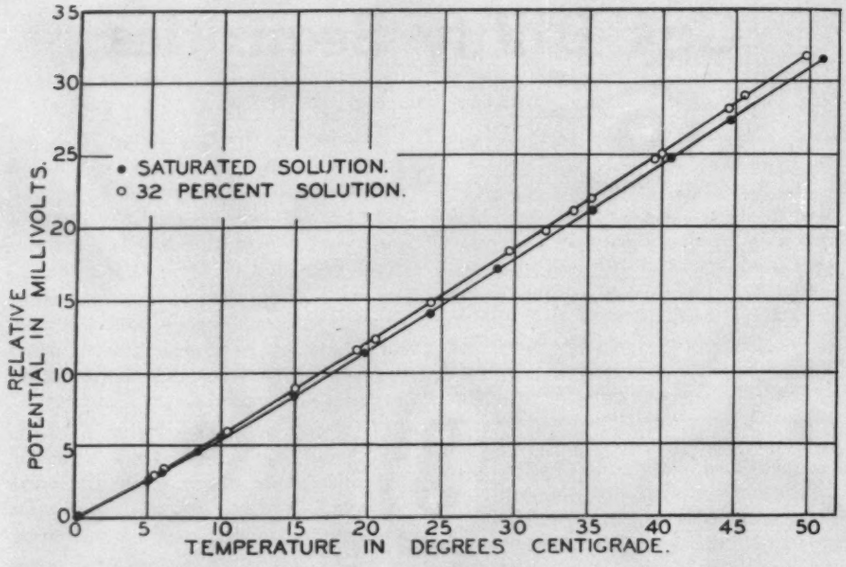

FIG. 1. Effect of temperature on the potential of cadmium-cadmium sulfate half-cell.

Cadmium Sulfate Electrode Measures Earth Potentials

IN A previous paper* on the copper-copper sulfate half-cell, certain properties of that half-cell were reported and the design of a half-cell suitable for field use was suggested. Although the copper-copper sulfate half-cell satisfies most of the requirements of field use, a half-cell whose potential is nearer the average potential of iron in soils would have several advantages in measuring the potential of a pipe line. It seemed desirable, therefore, to inquire into the possibility of using an electrode whose potential is nearer the potential of iron in soils. The standard electrode potential of cadmium is near that of iron. The cadmium electrode is more stable and reproducible than is the case with most metals. Its salts are highly soluble, have a high conductance and are stable. These facts indicate that cadmium might be used to advantage as an electrode in field potential measurements. The sulfate of this metal seems preferable to other salts since change in solubility with temperature is small.

SCOTT EWING

The requirements for a suitable cadmium half-cell for field use are essentially the same as those for the copper half-cell. The half-cell shown in the paper (*G A S*, May, 1939, p. 44) on the copper electrode, in which the copper is to be considered replaced by cadmium throughout, satisfies these requirements. As in the case of copper, the cadmium electrode should be shielded from convection currents carrying oxygen by being completely covered with powdered crystals of cadmium sulfate ($CdSO_4 8/3H_2O$).

Since a saturated solution of cadmium sulfate has roughly the same resistivity as a saturated solution of copper sulfate, one would expect the resistance of the cadmium sulfate half-cell to be approximately the same as that of a copper sulfate half-cell of the same dimensions.

Cadmium electrodes are less erratic than most copper electrodes in their potential behavior. They can be made more closely reproducible by plating with spongy cadmium from a dilute solution of cadmium sulfate at high current density. Electrodes prepared in this manner will seldom disagree as much as 0.25 mv.

The effect of temperature on the potential of the cadmium-cadmium sulfate half-cell has been determined over the temperature range from 0°C to 50°C with saturated $CdSO_4 8/3H_2O$ 32 per cent and 10 per cent $CdSO_4$ solutions. Temperature-potential curves are shown from which field potential measurements may be corrected to a common temperature. (See Fig. 1.) The curve for 10 per cent $CdSO_4$ is practically identical with the curve for the 32 per cent solution, and for that reason is not shown in the figure.

Measurements of polarization indicate that the error from this source can be kept below 1 mv by the use of spongy cadmium, provided the current density on the electrodes does not exceed 0.16 ma per sq. cm.

The resistance of a saturated cadmium sulfate half-cell is approximately the same as that of a copper sulfate half-cell of the same dimensions.

Either cadmium-cadmium sulfate or copper-copper sulfate half-cells and appropriate test circuits can be constructed without difficulty which will satisfy the requirements of field measurements. There is little to indicate that either half-cell has marked advantages over the other. Both are equally suitable for measuring potential differences in the earth. The cadmium half-cell has some advantage in measuring the potential of a pipe line in that the potential to be measured will be smaller. A disadvantage of the cadmium-cadmium sulfate half-cell is that its potential with respect to a calomel half-cell shows more variation than does a copper-copper sulfate half-cell when various soils are introduced into the conducting chain.

If there is any serious difficulty with these electrodes it will probably be caused by liquid junction potentials between the half-cell solution and the soil.

*Ewing, S. "The copper-copper sulfate half-cell for measuring potentials in the earth," presented before the A.G.A. Distribution Conference, Chicago, Ill., April 17, 18, and 19, 1939. A digest of Mr. Ewing's first paper was published in G A S, May, 1939, p. 44.

• **SCOTT EWING, research associate, American Gas Association, Washington, D. C., in a paper, "The Cadmium-Cadmium Sulfate Half-cell for Measuring Potentials in the Earth," presented before the American Gas Association Distribution Conference, Chicago, Ill., April 17-19, 1939. —(Abstract by G A S.)**

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Eldorado, Texas, Grants Natural Gas Franchise

The town of Eldorado, Texas, has recently granted a franchise for natural gas service to the Rio Gas and Power Co., San Antonio, Texas. According to F. A. Hornaday, president of the Rio Gas Co., construction of distributing and transportation systems will begin early in July. The gas will come from the Cooper Gas Co. field in Schleicher County, Texas.

■ ■

Davey Made Vice President

A. F. Davey, manager of the Sheboygan-Manitowoc Division of the Wisconsin Public Service Corp., has recently been elected a vice president.

What New Equipment Means to Gas Air Conditioning

• **CHARLES R. BELLAMY, Columbia Gas & Electric Corp., New York, N. Y., in a paper, "Reaching the Air Conditioning Market through the 1938-1939 Developments in Gas Equipment," presented before the Annual Convention of the American Gas Association, Natural Gas Section, Tulsa, Okla., May 8-11, 1939.—(Abstract by G A S).**

THE air-conditioning tools that are available to the gas industry today are as follows:

1. *The Gas Engine:* Here is a tool especially suitable in certain locations for large commercial and industrial installations. The possibilities of expanding its field of application appear to be good.

2. *The Dehumidifier:* There are at least three well-designed gas-operated dehumidifiers on the market. This equipment has been greatly improved during the past year and its cost reduced anywhere from 30 to 50 per cent. The modern dehumidifier with its cooling system can be used in many sections of our country to provide complete air-conditioning service. Wherever refrigeration is imperative, the low cost of the new models widens the market for split air-conditioning systems.

3. *The Absorption Refrigeration Machine:* One well-designed machine is now on the market and one or two others are expected to be put on commercial production some time this year. This new unit can do everything that the conventional electric unit does, as well as provide year-round air conditioning.

Collectively, these tools cover practically all requirements of air conditioning, so that wherever natural gas is sold, gas-operated air-conditioning equipment should forge to the front. There is high grade, economical equipment for big installations, little installations, and for the most exacting specifications.

Competitive Attitude

While gas equipment is being perfected, the manufacturers of electrical equipment are not standing still. Competition is extremely keen, and for some time gas is going to have to work very hard for every bit of air-conditioning business that it gets. Of interest in this connection is the attitude of the electric utility towards this new summer load. During the past year there has been a growing realization in several combination utility companies that it might be desirable to divert some of the energy supplied for air conditioning from the electric to the gas lines. If a definite policy favoring the use of gas wherever possible is made effective, not only by combination utility companies but by competing gas and electric companies, the result might be mutually advantageous. The steady power load of the fans and auxiliary equipment, which is the desirable part of the air-conditioning business from the standpoint of electric service, will go to the electric industry regardless of the form of energy used to carry out the cooling and dehumidification operations.

Practically all the equipment that the gas industry has been waiting for is now available and on the market. Since this is so, the time has come for the gas industry, especially those companies serving natural gas, to take an active part in the development of the air-conditioning business. A few companies already have crossed this Rubicon, but as yet there has been no united action. Some companies are asking what should be done. Undoubtedly one of the first steps should be to air-condition gas company offices, as has been recommended by several of the A. G. A. committees. Doing this not only makes customers comfortable but gives a practical demonstration of the value of true air conditioning. Several progressive gas companies have already taken this step. Another step is to establish an air-conditioning department headed by a trained engineer. Regardless of the company's policies on appliance sales, this proposed department is needed to advise prospective buyers of air-conditioning systems and to see that gas equipment receives fair treatment in the various set-ups as submitted by local architects and contractors. Possibly the greatest handicap that gas equipment has to face today is its lack of publicity and merchandising outlets. Local architects and contracting firms are, of course, much more familiar with conventional electric systems than with the newer gas units and need to be brought up to date and kept informed about the advantages of air conditioning with gas. Here is one place where the gas company representative can do much pioneer and constructive work. In addition, gas companies should make sizeable appropriations for advertising gas-operated air-conditioning equipment, so that as public interest in air conditioning is aroused, there will be general recognition of the fact that gas is just as efficient for summer cooling as for winter heating.

When is the big market for air conditioning going to open up? In so far as the gas industry is concerned, there are three main factors to be considered in any attempt to answer this question. The first is, competitive position of available equipment. Efficient, low cost and economical equipment is a prime requisite for new business. Since the above descriptive terms are used in their relative sense, it can be said that factor No. 1 is at the present time favorable to a rapidly expanding business. Factor No. 2 is concerned with merchandising methods and sales.

Sales Drive Needed

Obviously, equipment manufacturers need the full co-operation of the gas industry. The need for an intensive and progressive sales campaign by gas companies and equipment manufacturers is urgent. Factor No. 3 is concerned with the improvement in business conditions. The new industry, air conditioning, cannot by itself perform the impossible and correct all our economic ills, but by giving employment and by establishing higher living standards it can help business. Improved business will in turn stimulate the use of air conditioning, and then, when good times return, if the industry has done its part, the summer demands for gas should grow by leaps and bounds.

■ ■

Central Hudson Corp. Names Two New Vice Presidents

At a recent organization meeting of the Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y., Robert B. MacGuinness and Harris E. Dexter were elected vice presidents, the former in charge of operations and the latter in charge of commercial relations.

Mr. MacGuinness has been with the Central Hudson company for 16 years, and for the past 13 years has been operating manager. Mr. Dexter became general commercial manager 13 years ago. Both men are directors of the company.

■ ■

Missouri Co. Names Manager

E. M. Lause of Toledo, Ohio, has been appointed manager of the Harrisonville, Mo., office of the Interstate Gas Co. to succeed Frank Spellbrink, who recently resigned.

The Interstate Gas Co. supplies Harrisonville, Freeman, Drexel, Holden, Kingsville, Pleasant Hill, and Lone Jack, Mo.

TABLE NO. 1

Type of Service	Manfd. Gas 530 B.t.u.	Electric	Lbs. Coal	Imperial Gals. Oil
Cooking	1.75 M	125 kw. hr.		
Refrigeration	2.00 M	50 kw. hr.		
Water Heating supplying 1200 Imperial or 1500 U. S. Gallons Monthly 100° Rise Storage System	3.75 M	458 kw. hr.		
Oil Furnace and Boiler				36 to 45
Furnace Coil, Oil Burner and Boiler				40 to 50
Furnace Coil, Coal Furnace with non-insulated Tank			430	
Jack Pot Stove and Insulated Tank			670	

Increasing Gas Revenues By A Water Heater Rental Plan

• **GEORGE L. SCOFIELD, new business manager, Republic Light, Heat & Power Co., Inc., Buffalo, N. Y., in a paper, "Increasing Your Domestic Gas Revenues by a Water Heater Rental Plan," presented before the 32nd Annual Convention of the Canadian Gas Association, Hamilton, Canada, June 6 and 7, 1939.—(Abstract by G A S.)**

A NECESSARY requisite for adding new load and holding the present domestic business is a gas rate that is competitive to other fuels. The comparisons in Table No. 1 are accepted equivalent consumptions of fuels used for domestic purposes, which may act as a guide in determining competitive cooking, water heating and refrigeration costs for the average family.

From the comparisons in Table No. 1 it will be noted for cooking that 70c manufactured gas is equivalent to one cent electricity, and 56c manufactured gas is equivalent to eight mill electricity. Furthermore, 60c manufactured gas is equivalent to 5 mill electricity for water heating.

These comparisons clearly show reasons why some companies in many manufactured gas districts in Ontario are losing their cooking load and not securing the water heating and refrigeration business, as they are faced with electric competition at these low rates.

An Undeveloped Market

Today in most manufactured gas centers in Canada, there is rarely a saturation of more than 10 to 20 per cent of automatic gas and electric water heaters, and rarely a saturation of more than 20 per cent of automatic refrigerators. Thus, there remains great possibilities in this vast undeveloped market, as 80 to 90 per cent of this business has not been scratched by gas companies or electric competitors. Why not then consider class rates to attract this business?

The Republic Light, Heat and Power Co. had a similar condition in one of its New York State properties where 540 B.t.u. manufactured gas is served to approximately 6000 domestic customers. After a thorough study, it adopted, in October, 1938, a new class rate for any customer regularly using an automatic gas water heater and/or gas refrigerator. The estimated annual loss in revenues due to customers transferring to the new rate was relatively small—approximately seven per cent of the gross domestic revenues.

The major competition was flat rate electric water heating at a cost of $2.40 to $3.00 monthly.

The new rate is competitive to electricity and coal for water heating in this particular property.

In the past other reasons had been found why customers did not buy automatic gas water heaters, in addition to the high operating cost. These were: (1) the necessity of making a large down payment to buy the heater, (2) the obligation of buying the heater on a contract during very uncertain times, (3) the obligation and possibly unsound investment of purchasing an automatic water heater for a rented home where the landlord would not furnish such equipment.

It was, therefore, decided to adopt a trial rental plan for automatic water heaters to eliminate the fear of high gas bills and to overcome the three other common objections to the purchase of automatic water heaters, especially by tenants, who represent approximately 50 per cent of the customers and who seldom had purchased automatic water heaters.

The water heating equipment selected for the rental activity comprised a medium recovery automatic tank heater and three sizes of medium and high recovery automatic storage systems. The automatic tank heater has a thermostat located in the inlet of the coil. We find this heater is very popular, especially with tenants, as the rental is low and it is quickly installed without moving the owner's range boiler. The addition of strapped-on insulation completes the installation, which has proven to be very satisfactory, as the hot water delivery is faster than with an ordinary storage type water heater. This auomatic tank heater installation is rented at 35c a month, and, exclusive of installation costs and commissions, it will be amortized in approximately 60 months. The installation and commissions are charged to operating expense.

Where a customer has no tank or range boiler, or where such equipment is not in satisfactory condition, automatic storage systems are being rented at the following monthly charges:

20 U. S. Gal. Model, galvanized tank	$ .70
30 U. S. Gal. Model, galvanized tank	.85
40 U. S. Gal. Model, galvanized tank	1.00

These automatic storage systems will also be amortized in approximately 60 months, exclusive of installation charges and commissions.

A 30-day Trial

The rental plan permits this equipment to be placed on a 30-day proof trial in a customer's home, after which it may either be rented or purchased at the regular price for cash, or at a slightly higher price on terms over a period of time not to exceed 36 months. The renter has the option to purchase the heater any time within 30 months after date of installation with full credit for rentals paid to apply against the purchase price.

Salesmen are paid a rental commission of $4.00 on the automatic tank heater, $5.00 on the 20 U. S. gallon storage system, $6.00 on the 30 U. S. gallon model and $7.00 on the 40 U. S. gallon size. Sales commissions are approximately 50 per cent higher than these rental commissions, and when a salesman converts a rental into a sale, he will be paid the difference in these commissions. To encourage salesmen to add new load instead of changing over obsolete gas equipment only, bonuses ranging from $2.50 to $5.00 are also paid in addition to commissions for the replacement of competitive fuels. If the water heater is returned before six rental monthly

payments are made, the total commission and bonus are deducted from the salesman's compensation. If, after six and before 12 rental payments are made, 50 per cent of the salesman's total commission and bonus is deducted, but after 12 monthly rentals are paid, no charge-back is made.

To secure the assistance of operating employes, lead commissions of $1.50 are paid for productive leads, which are deducted from the salesman's commission and bonus. Dealers are being encouraged to cooperate and are receiving a commission on their rentals. The dealer further has the option of installing the heater at a nominal installation fee in addition to his commission. This dealer cooperation is proving very helpful.

Since the inauguration of this rental activity, just seven months ago, 566 new water heating installations have been secured, which are equivalent to all the water heaters sold in this property during the past six years. Reverts to date average only 10 per cent of the total rentals for various reasons—few of them being for the old complaint, "High cost of operation." It is fully expected at the close of the first year's operations through the installation of 850 rental water heaters to more than regain the loss of $14,124 annually in gross revenues incurred by the rate cut. It is, furthermore, anticipated that by continuing this program in 1940 and installing 500 additional automatic water heaters, increased net earnings will be shown at the close of that year, and for each year to come.

■ ■

Public Service Gas Co. Drops Pipe Line Plans

The Federal Power Commission recently granted permission to the Public Service Gas Co., Minneapolis, Minn., to withdraw its application for authority to construct a 1500-mile pipe line from Montana and Wyoming through North and South Dakota, Minnesota and Wisconsin. The line was opposed by coal operators in Minnesota.

The proposed line was to have cost $49,402,000, and would have served 115 cities and towns having total population of more than a million inhabitants.

A line that would serve practically the same communities has been proposed by the Kansas Pipe Line and Gas Co., and would extend from Kansas to the Mesaba Iron Range in Minnesota. Construction of the line is still subject to approval.

■ ■

Lone Star to Extend Mains

The Lone Star Gas Co. has entered into an agreement with the city council of Fort Worth, Texas, to extend its gas mains 100 ft. to any type of residence in sparsely settled sections without cost to consumers. Under a previous agreement, the company extended its mains only 50 ft. for each residence in outlying districts.

Sales Topics In Spotlight At P.C.G.A. Conference

LOAD building, appliance merchandising, and a review of what the gas industry is doing in sales, in engineering, in advertising, and at the two World's Fairs were topics under discussion at the Annual Northwest Conference of the Pacific Coast Gas Association, held in Seattle, Wash., on June 22 and 23. The total registered attendance was 83, representing 17 utilities and 14 appliance and equipment manufacturers, according to word received from Clifford Johnstone and Carl Swigart, Association officials.

The sessions were opened on June 22 by H. L. Farrar, president of the Association. Following the remarks of Mr. Farrar, the meeting plunged immediately into the subject at hand, "What It Takes To Build Gas Load." The five points of attack on this problem — cooking, water heating, refrigeration, house heating, and commercial and industrial sales — were discussed respectively by E. J. Ludeman, Washington Gas and Electric Co.; Ray Penning, Spokane Gas and Fuel Co.; C. A. Miller, Servel, Inc.; D. R. Faulkner, Seattle Gas Co., and G. S. Dawson, British Columbia Electric Railway Co., Ltd.

Norbert O. Fratt, Seattle Gas Co., discussed the utility's point of view, and John B. Hodgkins, James Graham Manufacturing Co., the manufacturer's outlook, in covering the topic "How Can the Manufacturer Help in Load Building?" What the utility should do in load promotion from the viewpoints of the manufacturer, retailer, and utility were presented by R. G. Logue, Ward Heater Co.; Herbert Schoenfield, Standard Furniture Co., Seattle, and James F. Pollard, president, Seattle Gas Co.

Appliance merchandising was up for discussion during the second day of the meeting. The sales leaders heard were W. C. Mainwaring, British Columbia Electric Railway Co.; A. F. Rice, Southern California Gas Co.; Wilson Gaw, Seattle Gas Co.: Warren E. Kraft, Erwin, Wasey & Co., and Katherine L. Rathbone, Southern Counties Gas Co.

"What the Gas Industry Is Doing" was the topic of the Friday afternoon meeting. R. E. Fisher, vice president, Pacific Gas and Electric Co., spoke on the two World's Fairs, while A. F. Rice reviewed the industry's sales activities.

H. L. FARRAR

H. G. LAUB

H. G. Laub, Southern California Gas Co., and chairman of the Technical Section, sketched the activities of his section. Among the contributions of the Technical Section this year are the publication of the *Data Book on Gas Utilization*, the development of instruments, including the simple flow meter, the precise manometer, the organization of a Calorimetry Standards Committee, and investigation of long-range meterology.

A luncheon was held Thursday at the Washington Athletic Club, at which was shown a motion picture made by employes of the Lone Star Gas Co., Dallas. The executive dinner was held at the Rainier Club, Thursday night, while a dinner for the visiting ladies was held at the same time at the Seattle Golf Club.

Canadian Gas Association, through its president, Julian Garrett, invited the P.C.G.A. to hold its 1940 Northwest Conference jointly with the meeting of the Canadian Association in Jasper National Park. A resolution was passed recommending that the P.C.G.A. board of directors accept this invitation.

■ ■

Northern Natural to Bring Gas to New Ulm, Minn.

The Northern Natural Gas Co., Omaha, Neb., has signed a contract to furnish the city of New Ulm, Minn., natural gas. Construction of a pipe line from Mankato to New Ulm will begin immediately, and a border station will be erected at the city limits.

The natural gas, which will replace the artificial gas formerly served, will be distributed through present lines by the Interstate Power Co. at an estimated saving of 34 per cent to consumers, according to C. E. Meyers, Interstate Power Co. representative. The B.t.u. of the gas will be 1000.

The Eagle Roller Mill Co. has contracted the Northern Natural Gas Co. to furnish gas for its boilers directly from the main. Cost of the project has been estimated at $250,000.

SALES Slants

Do You Know What Goes On In Your Prospect's Mind?

• **GAS IN THIS ISSUE continues with this chapter on "What Goes on in Your Prospect's Mind," a series of articles dealing with sales fundamentals. This series, which began in the Sales Slants department of the June, 1939, issue with a chapter entitled, "Getting Yourself in the Proper Frame of Mind," will continue for the next several months. These articles are not intended as a course of study nor do they aim to teach a new system of selling, but rather it is their purpose to present in a direct and unacademic manner a few of the fundamental principles on which the art of selling is based.—EDITOR.**

IN OUR first chapter in this series on sales fundamentals we discussed the salesman's frame of mind. We stressed the importance of the right slant on the job of selling. The salesman who goes places, we said in effect, is the one who believes in his job—has pride in his profession, confidence in himself, and faith in the product he is selling. That, every authority on salesmanship agrees, is Sales Fundamental Number One.

Sales Fundamental Number Two concerns the customer. Self-knowledge and self-mastery are of primary importance. But they are of small value in themselves unless they are coupled with an insight into the minds, emotions and reactions of others. Success in the profession of selling is dependent on the practitioner's ability to secure his client's confidence. Without the faculty of inspiring belief and faith in the proposition he is selling, a salesman cannot hope to win customers. Reduced to its simplest elements, the matter could be stated thus: A salesman cannot expect people to understand him unless he understands them.

If everyone was cut to the same pattern and out of the same piece of cloth, the job of learning how to know and understand your fellow men would be relatively simple. The fact is, however—and this is what makes salesmanship at once so difficult and so fascinating—there are no two people exactly alike. Character is a complex of intelligence, racial characteristics, inherent abilities, physical equipment, education, social background and similar qualities. The manner in which they are mixed and the extent to which they influence behavior are the things that determine what we call personality. Obviously, the possible combinations of all the factors involved are infinite, and only by knowing them all as they appear in the individual can we hope to really know that person.

Nevertheless, psychologists find that human beings fall naturally into two general personality classifications. One group they call *extroverts* and the other *introverts*, according to the tendency they have to behave in a certain way. The extrovert, as the name implies, is a person whose life is governed by things outside of himself. He is usually fond of society, sports and games. He is apt to be talkative, tolerant of others, fun loving, easy to approach.

The introvert, on the other hand, is a person who lives much within himself. He is a self-sufficient person, as a rule, and often prefers solitude to company. His tastes are generally intellectual, and generally he is slow to make friends; is uncommunicative and difficult to approach.

It should be fairly evident that the kind of approach and sales presentation which would be effective in selling the latter type of person could scarcely be expected to do the job with the former, and vice versa. Where an extrovert, for instance, could be sold on the number of bottles of beer a gas refrigerator would handle, the introvert would probably be much more interested in what made it operate silently.

These facts are so elementary that it should scarcely be necessary to bring them up. And yet there are a surprising number of salesmen who don't seem to realize that all people cannot be treated alike. So often the salesman will develop a certain manner, a certain method of approach, and a certain way in which he presents his product. Having found it effective on a fairly large number of people, he will adopt it for all cases. When it doesn't work, the chances are he will blame the customer and not himself.

It can be taken as a fundamental principle that the salesman must adapt himself and his sales presentation to the personality of the customer if he hopes to persuade him to buy. Centuries ago a very wise man said:

"Consider the other person in negotiations — adapt your approach and treatment of him personally, his needs, his circumstances, and his ambitions; and never let him feel that he is being coerced or rushed."

We have talked about introverts and extroverts, and we could go much more profoundly into the subject of their mentalities. But such theoretical matter is of little real value to the practical salesman. The knowledge that his prospect is an introvert or an extrovert is not of much assistance to the man who is selling a water heater. What is important, however, is the knowledge that the prospect's psychological make-up, his frame of mind, must be taken into consideration.

Perhaps it would be simpler if we put it this way: People have to have reasons for buying, and it is your job to try to find out why the prospect is more likely to buy what you have to offer. Mrs. Jones, doing her own housework in a five-room cottage, buys a modern gas range because of its labor-saving features. Mrs. Smyth, able to afford a maid, is not so much interested in that as she is in the marvelous job it does broiling a steak. Young Mrs. Brown goes for a gas refrigerator on account of its ability to produce all the ice cubes she needs for the parties she and her husband give two or three times a week. Mrs. White, on the other hand, takes the gas refrigerator in order to benefit by its food-saving features.

The frame of mind of these people is influenced by their economic circumstances, by their age, by their ambitions, and by their desires. It is influenced also by the particular type of personality which they possess. The salesman who determines the first, and then frames his presentation to appeal to the second, is well on the road to a sale.

We could sum up our first chapter in two words: "Know yourself." By the same token, the foregoing could be reduced to a similar simple proposition: "Know your prospect."

In the next issue we will discuss buying motives.

P.G. and E. Sponsors Summer Gas Heating Campaign

THE 1939 summer gas heating campaign, sponsored by Pacific Gas and Electric Co., San Francisco, began June 1 and will end August 31, it has been announced by O. R. Doerr, general sales manager. The campaign has been prepared by and for representatives of gas heating equipment manufacturers, distributors and dealers.

Two outstanding features of the campaign are a 10 per cent discount on qualifying sales made during the campaign period, and monthly payments to start October 1. The official rules of the campaign have been mailed to all interested dealers.

The campaign is being advertised in newspapers, on billboards, with truck cards, bill stickers, blotters and dealer display cards. The Pacific Gas and Electric Co. is supplying one-third of the cooperative advertising.

■ ■

Sale of Gas at N. Y. Fair Exceeds Expectations

The May sale of gas to New York World's Fair concessionaires, the Fair corporation and the municipal government for its exhibit totaled 65,949,000 cu. ft., nearly 6,000,000 cu. ft. more than was anticipated, according to the Brooklyn Union Gas Co. This makes a consumption of gas to June 1, including the pre-opening requirements, to 211,327,000 cu. ft. It is expected that 360,000,000 cu. ft. will be used by the close of the Fair next fall.

U.S. Home & Farm Authority To Finance Gas Appliances

A PLAN to finance the sale of domestic gas appliances on a nation-wide basis was announced last month by Emil Schram, president, Electric Home and Farm Authority, Washington, D.C. The new financing plan, which will follow as closely as possible the plan now in operation to finance electrical appliances, is being offered to utilities distributing gas only as well as to utilities distributing both gas and electricity. It is expected that the plan will include also those central plants serving liquefied petroleum gases, but as yet no definite plans have been formulated to provide for the gas appliance sales by individual dealers.

The gas appliances that are eligible for financing under this plan are: (1) gas ranges; (2) gas refrigerators; (3) gas water heaters; (4) furnaces and conversion burners.

The terms on which gas appliances will be financed are similar to the terms of the corresponding types of electrical appliances, which are as follows:

1. The finance charge is 5 per cent per year on the original unpaid balance.
2. The minimum down payment is 5 per cent of the retail installed price.
3. Individual appliances may be financed over a maximum period of 36 months.
4. Combinations of two or more appliances on the same contract may be financed over a maximum period of 48 months.
5. The minimum monthly payment is $1.50.
6. The minimum amount eligible for financing is $40.

Monthly installments are to be billed and collected by the utilities on the same dates that service bills are rendered and collected. A fee of $1 is paid to utilities for booking each contract and an additional 12½ cents per month for billing and collecting installments.

DOTTED LINE ROSCOE

"Yah suh, Mistah Roscoe, but if it don't make no noise, how's mah neighbors gonna know I got one?"

■ ■

New Book on Selling Written By Football Official

A new book on selling, which deals with the way selling or business can be made a game, has been written by Jack McCord, football official for Big Ten games and salesman for 20 years. The book, *Selling Is a Game* (Prentice-Hall, $2), is not a textbook, but the author's explanation of the principles of successful selling, which, he says, are the same for both selling and athletics. The author describes how outstanding competitors in every field of sport get their results, and how a salesman can use the same technique of winning in his own work.

■ ■

Gas Appliance Sales Break Ninety-One Year Record

The Brooklyn Union Gas Co. reports that sales of gas appliances by them for the first five months of this year totaled $1,511,991.88, an all-time high sales mark in the 91 years that gas has been available to residents of Brooklyn. The figure is $250,000 above those of the past, and tops last year's sales for the same relative period by 30 per cent.

■ ■

Appliance Men Entertained

Executives, managers and salesmen of the appliance industry in San Antonio, Texas, were guests of the San Antonio Public Service Co. at a dinner meeting held May 17 at the Gunter Hotel. R. E. Sivley, manager of the Commercial Department of the Public Service Co., acted as toastmaster.

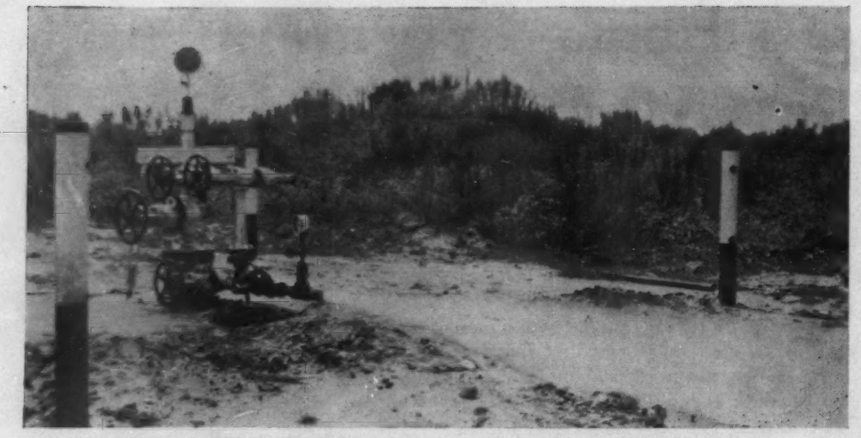


FIG. 1. View of the gas well, Hillegeist No. 1. The gas is produced through a ¼-in. choke with a back pressure of approximately 2000 lbs. The gage can be seen at left.

The Back Pressure Method of Gaging Gas Well Capacities

By J. E. COZZENS District Superintendent, Southern Union Utilities Company*

IN August, 1935, the Bureau of Mines developed the back pressure method of gaging gas well capacities. This method has been used extensively by Southern Union Companies in not only determining a well "open flow" capacity but also to determine a well's capacity to deliver gas under various conditions.

The advantages of this method over the old open flow method are numerous, the principal advantages being the prevention of waste of gas and damage to the wells or the producing formation.

At one time many states required that wells be gaged monthly. This meant that the wells were opened to the atmosphere and blown for at least 15 minutes a month. Billions of feet of gas were thus wasted when tested by the old method. In one Texas field the testing of the wells by the old method would result in the waste of over 115,000,000 cu. ft. each month.

In recent years some very large and very deep high pressure gas wells have been completed. Many of these wells, particularly those in the Gulf Coast section, produce from soft and porous formations. The testing of such wells by the old open flow method would not be practical because of the danger of damaging the formation or possibly damaging the well head fitting, thus allowing the well to get out of control.

The gas supply for the South Texas district of our company is from wells having rock pressures of over 2000 lbs. One of these wells has a potential open flow capacity of 50 million cu. ft. per day.

Fig. 1 shows one of these wells, the Hillegeist No. 1, producing gas through a ¼-in. choke with a back pressure of close to 2000 lbs.

The back pressure method eliminates the periodic open flow waste and the attendant hazards by tests which establish a formula for the capacity of each individual well. The formula derived from back pressure tests resembles the familiar pipe line capacity formula:

$$Q = \text{Constant} \times P_1^2 \quad - P_2^2$$

For well capacities, this same general formula is used with P_1 being the absolute rock pressure of the well, and P_2 being the absolute flowing pressure or back pressure at the top of the well. However, the power to which the difference in the squares of the pressures must be raised is not constant as in the pipe line formula, and may vary in different wells and might be the square root or one-half the power in one well and the square or second power in another and some other power in another.

The procedure outlined by the Bureau of Mines requires that the rock pressures and back pressures be calculated at what they would be at the face of the sand. In doing this it would be necessary to add the weight of the column of gas in the well to observed pressures at the well head. However, we have found that, where wells are equipped with tubing or siphon lines so that the friction factor can be eliminated, this refinement is an unnecessary complication and does not affect the results.

Tests are made in the following manner:

The well's shut-in pressure is noted after allowing the well to remain closed for a sufficient time for the pressure to stabilize. The value of P_1^2 is then calculated.

The well is then allowed to produce on at least three rates of flow through the casing with the tubing pressures for each rate being noted.

When there is liquid in a gas well, its presence will usually be detected by fluctuations of the well head pressure at some one of the three rates of flow; and, where this condition is noted, the high rates of flow may be made first in order to allow the well to clear itself of the liquid.

The rock pressure should be noted both before and after the flow, as this will provide a check against erroneous pressure readings due to liquid in the well bore.

The difference of the square of the rock pressure and the square of the flowing pressure thus obtained plotted against the rate of flow on logarithmic graph paper should determine a straight line. The graph thus made will not only indicate the open flow capacity of the well but its capacity with various back pressures.

The relationships indicated by this graph will ordinarily hold true over the life of the well. Thus in the normal depletion of a gas field it is possible to determine the open flow capacity of a well at any future time from the graph obtained by the first test. It is necessary only to gage the rock pressure.

Aside from the saving of gas, back pressure tests have served our company in two important ways. We are connected to several wells with rock pressures of over 2000 lbs. Open flow tests on such wells would be hazardous. We are also connected to a great many shallow wells whose open flow is extremely small and whose rock pressure is approaching our line pressure closer each year.

With rock pressure decline curves of these wells established, and with estimates of the line pressures that will be required on peak days to come, we have been able to forecast accurately our need for additional wells and compression facilities from our back pressure curves. This has enabled us to keep idle capacities to a safe minimum.

*Reprinted from the May 1 issue of the Southern Union News.

The Dealers Made the Sales; The 4-year Total—$2,000,000

By W. H. TIPTON, JR. Advertising Manager, Houston Natural Gas Company

GAS appliance dealers in the Gulf Coast section of Texas served by Houston Natural Gas System are walking around with their chests thrown out and a knowledge of profit dollars in the bank since they've analyzed the four-year sale of gas appliances, 1935 through 1938. For in this gas system they have had 100 per cent cooperation from the gas utility—an active cooperative program that has enabled them to work together in seasonal promotions of all gas appliances that has produced startling results.

A 16,000-meter system may seem small, scattered as it is over a 400-mile stretch that serves 50-odd communities and no large towns, but these dealers can point with pride to the record of selling, on the average, each home more than one major gas appliance in the four years, either a gas range, a gas water heater, or a gas refrigerator.

A Four-Year Record

The four-year record of sales is 7987 ranges, 5847 water heaters, and 3073 gas refrigerators. Add to these 12,789 radiant or circulating heaters and 160 central heating systems or floor furnaces, and it represents an average of nearly two gas appliances per home, sold exclusively by dealers!

The dollar volume of this business by dealers is perhaps even more impressive. Figured conservatively on an average sales price of $100 for a range (and the average sale is above that), $60 for a water heater, and $200 for a gas refrigerator, this gives $1,764,120 in sales in the four years for the three major gas appliances. Add in 12,789 gas heaters at an estimated $15 average and 160 central or floor furnaces at $200 average, and the total is right at the two million dollar mark!

The towns in which this dealer record has been compiled are served by Houston Natural Gas System (outside Houston), composed of Gulf Cities Natural Gas Co., Texas Natural Gas Utilities, and Tex-Mex Natural Gas Co. Gulf Cities Natural Gas Co. serves a number of communities through district offices in Silsbee, Goose Creek, La Porte, Texas City, and Freeport. Texas Natural Gas Utilities boasts of seven district offices: Alvin, Richmond, Wharton, El Campo, Palacios, Victoria, and Beeville. Tex-Mex Natural Gas Co. serves the great King Ranch country, with district offices in Alice and Kingsville. These are allied companies of Houston Natural Gas Co., which serves between one-third and one-fourth of the homes in fast-growing Houston, Texas, the seaport 50 miles inland.

The secret of these dealers' success in gas appliance merchandising lies in a number of things. In the first place, they talk to prospects for gas appliances with the assurance that no gas company salesman will be trying to make a competing sale. Instead, they can look for help from gas company employes in talking with customers about the advantages of modern gas appliances. In the second place, each dealer has his own lines of gas appliances displayed throughout the year in the gas company district office, a free display that bears the dealer's name. In the third place, the gas system has made available, through the facilities of a nationally-known financing organization, easy budget terms for each cooperating dealer. Payments on any AGA-approved gas appliance may be budgeted over a period up to 48 months, payments are made with the monthly gas bill, and dealers have no recourse after three payments are made. These terms are restricted to a minimum contract of $35 and a minimum monthly payment of $1.50. A purchaser may secure a gas range from one dealer, a water heater from another, a gas refrigerator from still another, and finance them all over a 48-month period with one contract. The popularity of this easy payment plan is shown by the fact that in the past two and one-half years, over 3100 sales totaling more than $550,000 have been financed in this manner in these three companies.

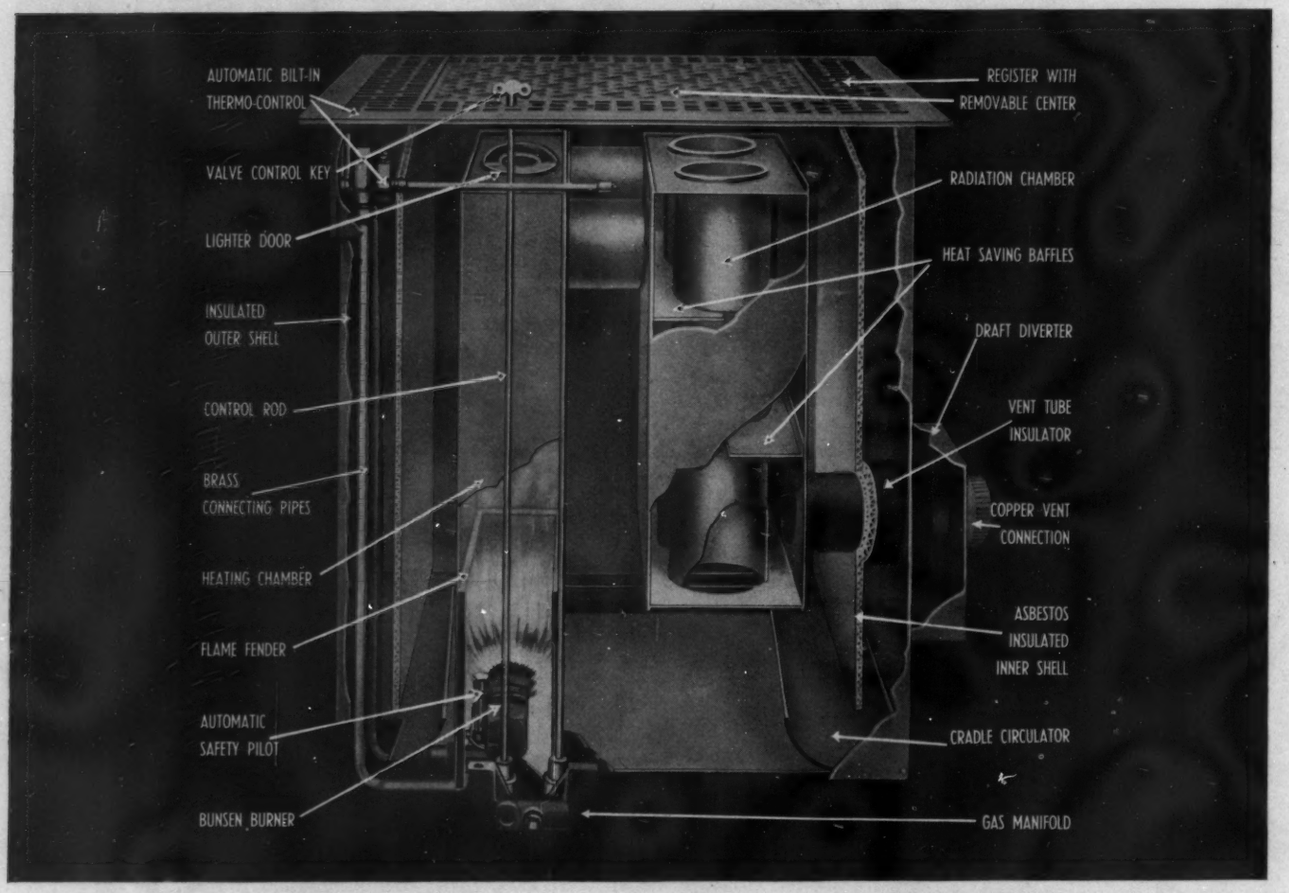
In the fourth place, the gas system maintains a record of the appliances used by each of its customers, and is able to, and does, furnish all dealers with a live prospect list for each seasonal campaign. Dealers make reports each month of sales made by them to these customers, and this information is kept up to date. New surveys are made at three- or four-year intervals to insure an accurate record.

Advance Planning

Finally, the year's program of gas appliance activity is mapped out a year in advance, quotas are assigned each district on the basis of a given percentage of meters to be sold each appliance, and dates are set for seasonal cooperative campaigns. These seasonal campaigns are planned by the gas system's advertising department, and presented to all dealers in portfolio form before each campaign. The gas system pays all expense of planning, art work, plates, type composition, mats, etc., and advertisements are ready for each newspaper in mat form to be run over

An interior view of the Goose Creek offices, Gulf Cities Natural Gas Company, showing the appliances on display. Gas-fired equipment air-conditions the office.

INSIDE FACTS ABOUT



Look into this *furnace* for load building *performance*

☆Installed in a day to serve a lifetime

The Ward Floor Furnace is completely self-contained. There are no external controls or accessories. Ward Bilt-in Thermo-Control is part of the furnace, regulated by an indicator in the corner of the register. This makes installation simple. Just drop the complete furnace into the floor opening...connect to vent and gas line... and it's ready for action! *You don't have to hire an electrician to help install a WARD Floor Furnace.*

In your city there are hundreds of opportunities to make a "best seller" out of the WARD Floor Furnace. There are many homes inadequately heated with *unvented* appliances. Those consumers are probably pretty dissatisfied with gas as space heating fuel. You can make them your friends for life with a *vented, permanent, 10-year-guaranteed* WARD.

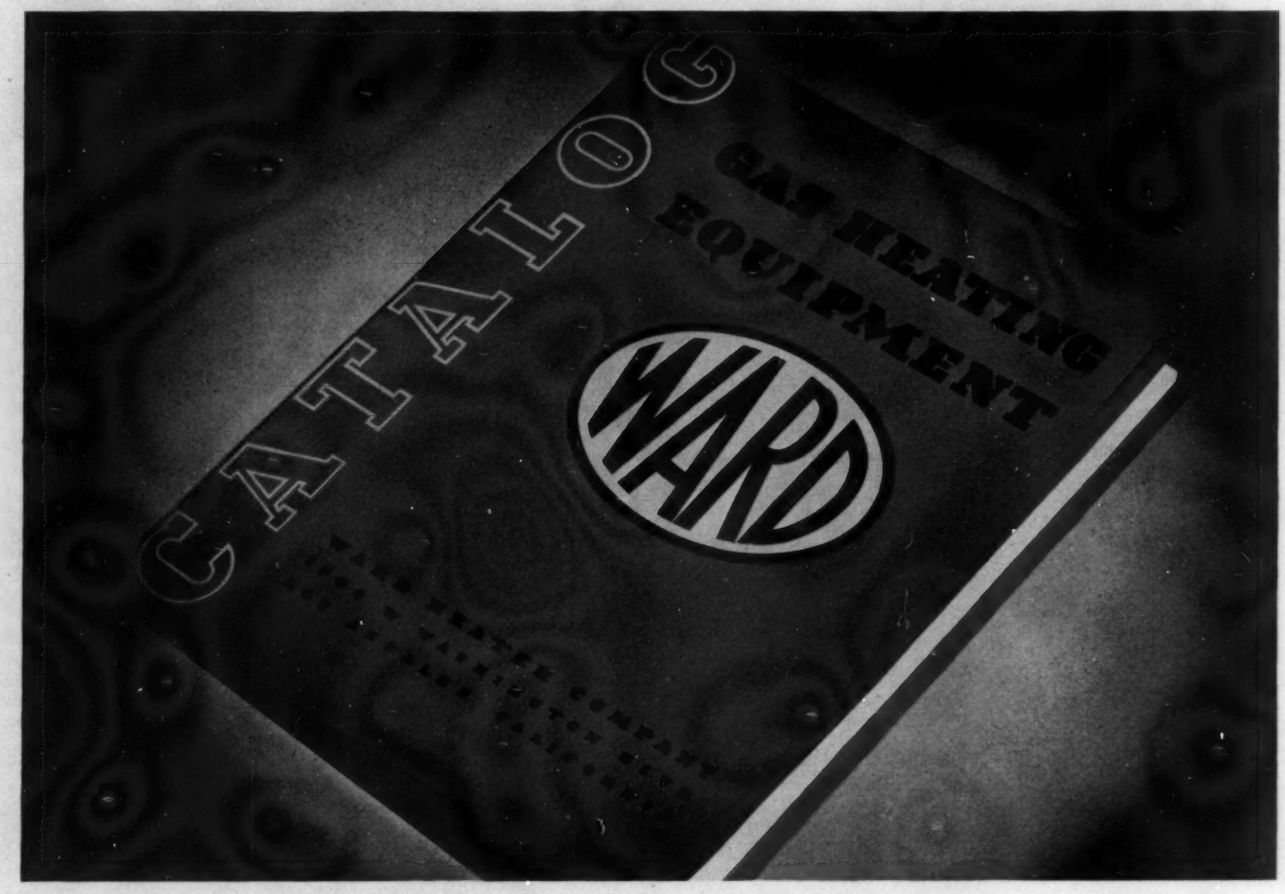
There are homes heated by *temporary, portable* appliances that can be thrown out too easily. A WARD Floor Furnace becomes a *permanent* part of the house. It stays put...assuring that outlet for your gas from now on. There are *new* homes...one-story dwellings *without basements*...where a WARD ideally solves the heating problem...for the owner and for you! And there are small stores and offices that WARDS were exactly made for.

Check these sales possibilities. Check the advantages of WARD'S superior construction, with its automatic features... *Bilt-in Thermo-Control, Automatic Safety Pilot, Cradle Circulation.* Put them all together, they spell load-building sales, and PROFITS FOR YOU. *May we send you our catalog?*

WARD

WARD *AUTOMATIC* FLOOR FURNACE

A WARD "BEST SELLER"



Look into this *catalog* for load building *information*

This catalog contains information that has helped many a good gas merchandiser build and protect load in small homes, stores and offices.

After all, it's the *appliance* that sells the gas...and it's the way the appliance performs that decides whether your customer is pleased or dissatisfied with gas as a fuel for space heating.

For thirty years, the WARD Floor Furnace has been a *"best seller"* in the merchandise departments of gas utilities. And it has been doing a successful job of selling gas and keeping customers sold on gas. The result of that experience is worth knowing about.

It will take ten seconds to write four words on your letterhead..."*Send me your catalog*"! That doesn't cost you anything. But for some gas company merchandisers it has been the first step to a long and profitable "warmth friendship" with WARD. So, *may we send you a copy?*

WARD HEATER COMPANY • LOS ANGELES

FACTORY REPRESENTATIVES

A. S. KINCAID, 2012 North Harwood, Dallas, Texas · J. H. STUBBINS, 300 East 68th Terrace, Kansas City, Missouri · H. C. SANDERSON, 207 Fulton Building, Pittsburgh, Pennsylvania · W. D. ROBERTS, 468 Peoples Gas Building, Chicago, Illinois · LEON M. TAYLOR, 3200 Main Street, Dallas, Texas.

WARD

WARD *AUTOMATIC* FLOOR FURNACE

the joint signatures of cooperating dealers in each town. This space is paid for by these dealers on a pro-rata basis at low local rates. Direct-mail pieces are prepared and mailed to known prospects at the expense of the gas system. Special campaign displays for dealers' windows and display floors, window streamers and truck banners are used in many campaigns and furnished without cost to each cooperating dealer.

One interesting thing about these cooperative appliance campaigns is that no brand name is featured. In the water heater campaigns, automatic hot water service with the hot water faucet emblem is used, with no illustration of any water heater. In range campaigns, a modern gas range is featured, not a given brand of range.

The gas appliance dealers that have compiled this sales record of selling, on the average, one major gas appliance to each home, are not supersalesmen. They are hardware stores, furniture stores, general merchandise stores, automobile dealers, appliance shops, and plumbers. Some few of them employ outside salesmen; most of them do not. In all cases, they are local firms that have an established trade and the confidence of the public generally.

Sales results each year are computed on the basis of October 31st meters, and these same meter figures are used in setting quotas for the next year's appliances sales. In 1938, 2098 gas ranges were sold, or 12.5 per cent of the 16,785 meters served; 1737 water heaters were sold, or 10.3 per cent of meters; and 646 Servel Electrolux gas refrigerators, or 3.8 per cent of meters were sold. Quotas for 1939 have been set on the basis of selling 12 per cent of meters a range, 9 per cent of meters a water heater, and 5 per cent of meters a gas refrigerator. Each district has its quota for each appliance, and gas system district managers and gas appliance dealers accept these as minimum figures to work together in attaining—and surpassing.

An 11 M.c.f. per Hour Burner

(Continued from Page 21)

point of vitrification and the subsequent cooling time allowed. Normal operation of the burner at present is around 8500 cu. ft. per hr., though this can be stepped up to 12,000 or reduced to somewhat less than 1000, in the latter case the gas burning on the screen in the nozzle. The atmosphere control is very good and though in normal operation there is no flame apparent at 2200°, it is possible to burn with a flame of 20 to 30 ft. long and thereby obtain reduction on the surface touched by the flame. As compared to the atmospheric burners, the production has been substantially increased by this pre-mix burner with a decrease in gas consumption, and it makes possible absolute duplication of color and material characteristics. The flame is very noisy, due perhaps to the rapidity of the combustion, but is remarkably easy to control and permits regulation of a delicate process by unskilled operators.

Unless the material being fired has a strong tendency toward ringing in the kiln, there is no justification for mounting the burner in swivel joints. A burner of this general type could easily handle an operation up to at least 2450° and the control system installed on this particular one can hold the temperature within 30° or 35° despite variations in the temperature in different sections of the material radiating to the thermopile. Exclusion of all possible sources of air are of vital importance to controlling the atmosphere. Care must be taken with dusty materials to maintain a minimum velocity of mixture injection or the products will blow rapidly through the kiln and carry excessive quantities of dust up the stack. In general, this type of installation has been found highly successful and should be adaptable to almost any similar processes with equal success. Since the original atmospheric burners did not vitrify the clay successfully, no cost comparison can be made. No other fuel than gas was considered because of the close atmosphere control and hot zone location required, so no information concerning use of competitive fuels is available.

■ ■

Texas Co. Issues Bulletin

The second volume of the *B.T.U. Banter* has made its appearance, published by the office employes of the Texas Cities Gas Co., Galveston district. Among those responsible for the publication, which carries news about the employes, are Carol Scholl and Mary Lou Davis.

■ ■

Arlington Utility Man Dies

Wilfred F. Forbes, assistant superintendent, Arlington (Mass.) Gas Light Co., died recently at his home in Arlington. He had been with the company for 18 years.

E. F. SCHMIDT

F. L. CHASE

F. L. Chase, Vice President of Lone Star, Retires

FRANK L. CHASE, for 22 years associated with Lone Star Gas Co., Dallas, Texas, on June 1 announced his retirement as vice president of that company. Elmer F. Schmidt, who was named vice president of Lone Star in 1936 and who had served as general superintendent since 1920, has been appointed operating manager to succeed Mr. Chase.

A graduate of Massachusetts Institute of Technology, Mr. Chase entered the gas business about 1900 in executive charge of eight companies serving Dayton, Springfield and towns in the Miami Valley of Ohio. After joining Lone Star in 1917, he organized the gas measurement department, and as operating manager has directed supervision of production, pipe lines, compressor stations, gasoline plants and the telephone system.

Mr. Chase has served as director of the former Natural Gas Association of America, has been chairman of the natural gas department of the A. G. A., and a member of the management, executive and technical committees.

In recognition of his service, Mr. Chase's associates presented him with a watch at a luncheon held June 5. L. B. Denning, Sr., president of Lone Star, made the presentation.

Mr. Chase's retirement was announced just before the 30th anniversary of Lone Star Gas System, which was observed June 4 with ceremonies rededicating the principles upon which it was founded. Since its beginning in 1909, the company has grown from two small distributing plants to a system with 4700 miles of pipe lines, 1000 gas wells in 31 separate fields, 300,000 customers and over 3000 employes.

■ ■

American-Michigan Co. Plans Thirty-five Mile Line

Construction of a 35-mile, 8-in. pipe line in Michigan has been proposed by the American-Michigan Pipe Line Co., Muskegon, Mich. The new line will connect the Van Horn field in Clare county with the company's system in Austin township, Mecosta county. At the present time gas from the Austin field is being served the residents of Muskegon for industrial and domestic purposes.

■ ■

Utility Executive Resigns

Fred J. Hatch, for the past 13 years advertising and publicity executive for the Wisconsin Public Service Corp., Green Bay, Wis., joined Klau-Van Pietersom-Dunlap Associates, Inc., Milwaukee advertising agency, effective June 1, according to an announcement made by Frank V. Birch, executive vice president of the firm.

He will continue to serve the Wisconsin Public Service Corp. as special consultant.

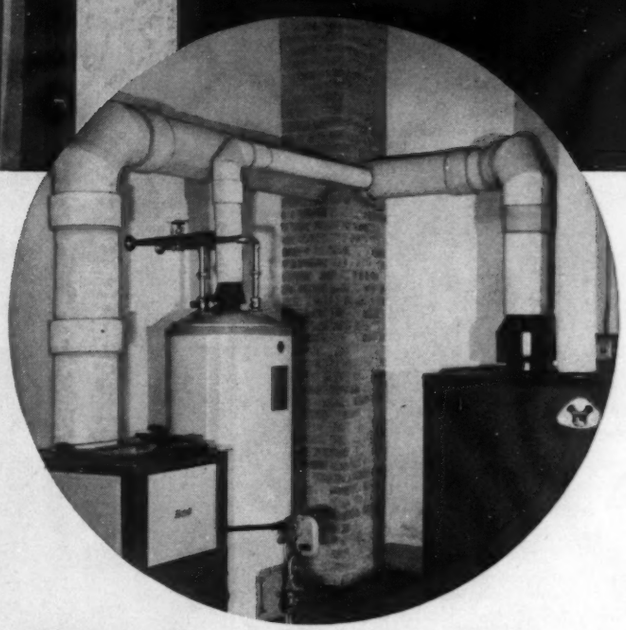
Helps KEEP CUSTOMERS SOLD on GAS FOR THE "4 BIG JOBS"...

RAPID INSTALLATION is made possible by the ease with which J-M Transite Flue Pipe is handled. A complete line of fittings . . . a full range of sizes in both round and oval form . . . make assembly simple under any conditions.

EVERY DAY, you're selling more home owners on the reliability of gas for heating, cooking, refrigeration and hot water. But once the sale is made, you've got to make sure the appliance *stays* sold. That calls, among other things, for efficient venting systems. And, by specifying J-M Transite Flue Pipe for all your venting jobs, you assure long, dependable service . . . with maximum assurance of permanently low maintenance costs.

These important advantages are due to Transite's asbestos-cement structure. It is exceptionally resistant to weather and corrosion, cannot rust or burn, and is listed by the National Board of Fire Underwriters. Furthermore, Transite is quickly, easily installed, even in restricted working quarters, and never requires paint to preserve it. Grayish-white in color, it is neat and attractive and cannot stain adjoining parts of the building.

Customers appreciate the efficient, virtually trouble-free service of Transite Flue Pipe systems. You'll find their satisfaction works to sell more appliances. Why not get full details on this modern vent pipe? Write for Brochure TR-13A. Johns-Manville, 22 E. 40th St., New York City.



HIGHLY CORROSION-RESISTANT because of its asbestos-cement composition, Transite Flue Pipe keeps maintenance low. It gives dependable service that keeps customers sold on the convenience of using gas for the "4 big jobs."

AT THE NEW YORK WORLD'S FAIR
be sure to visit the J-M Building. And don't miss the interesting use of J-M Transite Flue Pipe in the American Gas Association Building.

JM PRODUCTS Johns-Manville **TRANSITE FLUE PIPE**

THE WOMAN'S *Viewpoint*

Women Study Home Service In the World of Tomorrow

HOME service women from public utility companies in the United States and Europe met June 13 at the "Court of Flame" theatre of the Gas Industries Building at the new York World's Fair and learned of the important role this country's gas industry and its fuel play in the exposition. They were told that women in the world of tomorrow will lead in the professional cooking field. Mrs. Sally Ambrose, home service director of the Consolidated Edison Co. of New York, presided at the meeting.

The principal speakers on the program were George Rector, world-famous food authority and official host of the Gas Industries Building at the Fair, and George F. Owens, assistant vice president of the Brooklyn Union Gas Co., of Brooklyn, N. Y.

Mr. Rector told the home service women of the varied and colorful ways in which food was being prepared at the Fair. He said that the perfection of the food served at the exposition indicated "that the world of tomorrow will be a gourmet's paradise." He said that women are taking the lead in the professional cooking field and that many restaurant and hotel kitchens once staffed solely by men now use women.

Mr. Owens outlined the extensive use of gas at the Fair, stating that more than 90 per cent of the exhibitors are using gas for the four big jobs.

Also included on the program were Miss J. J. Walsh, of Winchester, England, and Anne Tonseth, of Bergen, Norway, who described the home service training and activities in their respective countries.

The program was arranged by a committee of which Miss Jessie McQueen, home service counsellor for the American Gas Association, was chairman. Gas industry officials who attended the meeting included: C. W. Berghorn, managing director of the Association of Gas Appliance and Equipment Manufacturers; Stanley Finch, World's Fair co-ordinator for Gas Exhibits, Inc., and E. H. Poe, of the American Gas Association.

Home economics editors of leading women's magazines also attended the World's Fair meeting. Among them were Camille Davied, of *McCalls*; Eloise Davison, of the *New York Herald-Tribune*; Katherine Fisher, of *Good Housekeeping*; Grace Pennock, of the *Ladies Home Journal*, and Ada Bessie Swan, of *Woman's Home Companion*.

Following the meeting, a luncheon was held in the garden patio of the "Court of Flame" restaurant. Later the home service women and their guests inspected "Homewood," the model all-gas home which is part of the Gas Industries exhibit group. They also attended a performance of the Victor Puppet Opera, whose stringless puppets presented "La Traviata."

New Home Service Workers Join The Gas Service Co.

JESSIE McQueen, home service director of American Gas Association, was expected to attend a home service conference of The Gas Service Co. in Kansas City on July 5-6, according to an announcement by the company's new business manager, F. M. Rosenkrans.

Vernice Shipman has become a new member of the home service department of The Gas Service Co. in Kansas City, taking the place of Helen Bradley, who, on July 1, became director of home service for the Union Gas System at Independence, Kan.

Other new members of the company's home service department are Helen Lillibridge, who will be assistant to Doris Ingle in the Wichita, Kan., office, and Virginia Johnson, who has been assigned to the Topeka, Kan., office under Jewel Hensley.

■ ■

Mrs. Milne, Gainesville Gas Co. Manager, Resigns

Gertrude McKay Milne, vice president and general manager of the Gainesville Gas Co., Gainesville, Texas, has recently announced her resignation, effective July 1. She is succeeded by Ben Yeakley, who has been assistant manager of the office for several years.

Mrs. Milne joined the company as her husband's secretary, and after his death in 1934 succeeded him as receiver. Later she was named vice president and general manager.

■ ■

Fair Features Gas Restaurant

Featured at the gas industries World's Fair exhibit group is the "Court of Flame" Restaurant. Situated in one wing of the exhibition hall, it has facilities for over 600 people at one time with an outdoor terrace accommodating over 250. An unusual feature of this restaurant is the "all-gas" kitchen which is visible and open to the public. It is so constructed that diners will see each of the steps in the preparation of their food.

Home service women of public utility companies in the United States and Europe who met at the "Court of Flame" theatre of the Gas Industries Building at the New York World's Fair on June 13 are shown above on the steps of the spectacular "Court of Flame." Shown with them are (extreme right, lower row): George Rector, host of the Gas Industries Bldg., and Stanley Finch, World's Fair co-ordinator for Gas Exhibits, Inc.

Have you an open door policy?

A SATISFIED CUSTOMER MEANS A READY WELCOME FOR GAS COMPANY REPRESENTATIVES

"GOOD MORNING, Mrs. Jones. Just thought I'd see how you like your new Servel Electrolux."

"It's fine, Mr. Johnson. I wish we'd bought one for our first automatic refrigerator."

"Now that you're using gas for refrigeration as well as cooking, perhaps you'd like to hear how people use this clean, economical and modern fuel for other jobs in their homes."

"Won't you come in, Mr. Johnson?"

* * *

THIS SALESMAN works for a gas company that has an "open door" policy.

They realize that by pushing gas refrigeration, they not only protect their present load, but keep the door open for sales of other services and appliances to their customers.

In addition to going after the market of people who have yet to buy their first automatic refrigerators, this company is aiming at those who are replacing their old ones.

They know that they must capture this country's rich replacement business* now—or perhaps have to wait for years for another chance.

Thus, through establishing the modernity of gas service and promoting the use of "Gas for All Four Jobs," they are assuring their salesmen ready welcome and steady business for years to come in homes throughout the community. * * *

Have you an open door policy?

Servel, Inc., Servel Electrolux Sales Division
Evansville, Indiana

***It is estimated that more than a million automatic refrigerators will be replaced in 1939.**

The **SERVEL** **ELECTROLUX** *Gas Refrigerator*

Gas Refrigeration . . .

- **Publicizes Modernity of Gas**
- **Protects Your Present Gas Load**
- **Stimulates Sale of Other Gas Appliances**
- **Builds Gas Load without Extra Investment**
- **Promotes "Gas For All Four Jobs"**

WINS GOOD WILL FOR GAS AND GAS SERVICE

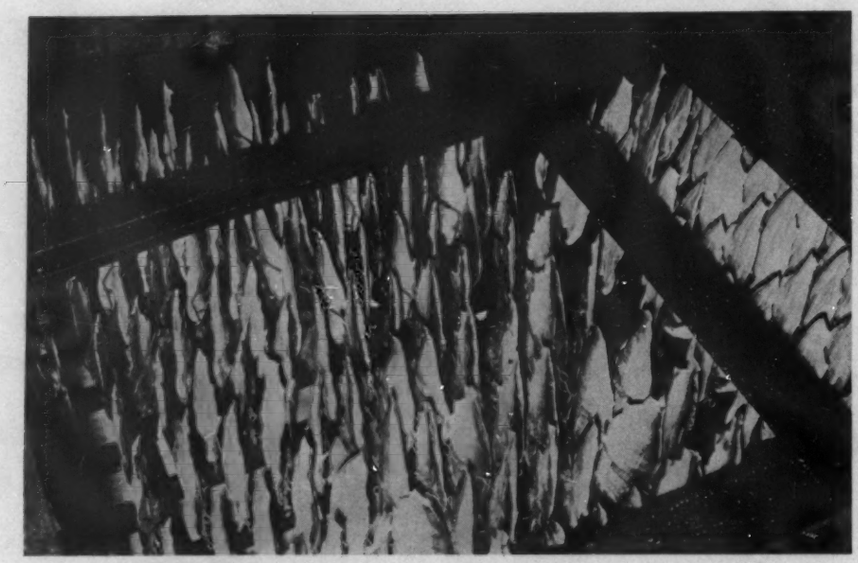


FIG. 1. A first tier of salmon sides is hung at the top of the new dry-air smokehouse. Successive tiers down to within six feet of the floor complete a load of 4000 lbs. which can be dried at once without fire in the smokehouse.

Silica Gel Unit Improves Fish Smokehouse Practice

By HARRY W. SMITH, Jr.
Industrial Gas Section, A. G. A.

THE Mutual Smoked Fish Co., of Paterson, N. J., handles 30,000 lbs. of fish per week, of which 8000 to 9000 pounds is mild-cured salmon, which is smoked in a new type of smokehouse in which dehumidified air from a gas-fired silica gel unit does the drying. The only fire in the smokehouse is that required to keep a few oak logs smouldering and giving off the flavoring smoke.

"The biggest danger in the business, especially with mild-cured salmon, is the 'burning' or over-cooking of fish. If a smokehouse gets too hot the fish gets mushy, bad looking, and fragile." When drying is done with dehumidified air which is never allowed to exceed 90° F. in temperture, and there is no fire (at least for heating purposes) in the smokehouse, "overcooking" is unlikely.

As far as available records show, the company's gas-operated dry-air fish-smokehouse is one of the two engineered to utilize this principle of fish drying. It was installed in July, 1938, and measures 25 by 25 ft. in floor area and is 20 ft. high, giving 12,500 cu. ft. of space.

The smokehouse is supplied with 1300 cu. ft. of fresh dehumidified air per minute at 40 to 45 per cent relative humidity and 80 to 90° F. The air comes from a Bryant No. 14 silica gel air conditioning machine fired with 525 B.t.u. per cu. ft. city gas. The burners of the unit use gas at a rate of 275 cu. ft. per hour when operating at capacity. There is a connected load of 2 kilowatts per hour for operating the blower and other devices which are part of the unit. To cool the air down to 80 to 90° F. from the 150° F. it attains in the process of dehumidification, a standard Trane cooler, packed with finned metal coils carrying cold water (usually at 45 to 60° F.) is located between the Bryant unit and the delivery ducts. The humidistat is located at the side of the machine inside of ducting through which a small sample of air from the smokehouse is continually drawn.

The smokehouse itself is a brick-walled room with an insulated roof. All windows are painted to exclude the radiated heat of sunlight. The drying air, as controlled for both moisture and temperature, enters through sheet metal duct work which runs horizontally along one wall about 5 ft. from the floor and is vented into the room from three evenly spaced registers. In this ducting is a damper control which regulates the flow. Circulation in the smokehouse is achieved mainly through one airplane-type circulator fan, about 6 ft. above the inlet registers, although desk fans are used now and again in various spots throughout the smokehouse to keep the air moving correctly in accordance with the distribution of fish loaded into the chamber. The exhaust opening from the room is at the very top, 20 ft. up, in the same wall on which the inlet registers are located.

An interesting feature of the installation is that the dehumidifying unit and cooler are located in a sheet metal penthouse on the roof of the plant, and thus take no plant floor-space. Such a convenient set-up is possible only because the unit is completely automatic and requires little or no attention. It need only be turned on when the fish are loaded in the smokehouse and the flow of dry air is needed, and turned off when the job is done.

The air in the smokehouse is completely changed more than six times per hour. At this high rate of ventilation, and with all the input air being fresh and so closely controlled with regard to both temperature and humidity, truly scientific operation has been achieved—and as a result a finer product of more uniform quality is secured.

■ ■

Natural Gas and Petroleum Ass'n. of Canada Meets

The 16th annual convention of the Natural Gas and Petroleum Association of Canada was held June 1-2 at the Hotel General Brock, Niagara Falls, Ont. President Major E. Sweet presided over the sessions.

Featured on the program were papers presented by S. B. Severson, Dominion Natural Gas Co., Buffalo, N. Y.; R. S. Agee, Association of Gas Appliance and Equipment Manufacturers, New York; and Ralph E. Davis, Pittsburgh, Pa. The program also included a questionnaire on practical natural gas problems, discussions of home service work, gas wells, transmission and distribution, and an open forum.

Officers unanimously reelected are C. E. Steele, Port Colborne, honorary president; Major E. Sweet, Brantford, president; S. B. Severson, Buffalo, first vice president; J. A. Richie, Buffalo, second vice president; S. A. Morse, Chatham, secretary-treasurer; and Joseph McKee, Hamilton, assistant secretary.

■ ■

Iowa Utility Man Retires

Jack Ainsley, superintendent of gas distribution for Peoples Light Co., Davenport, Iowa, has recently announced his retirement. He had been with the company since 1886.

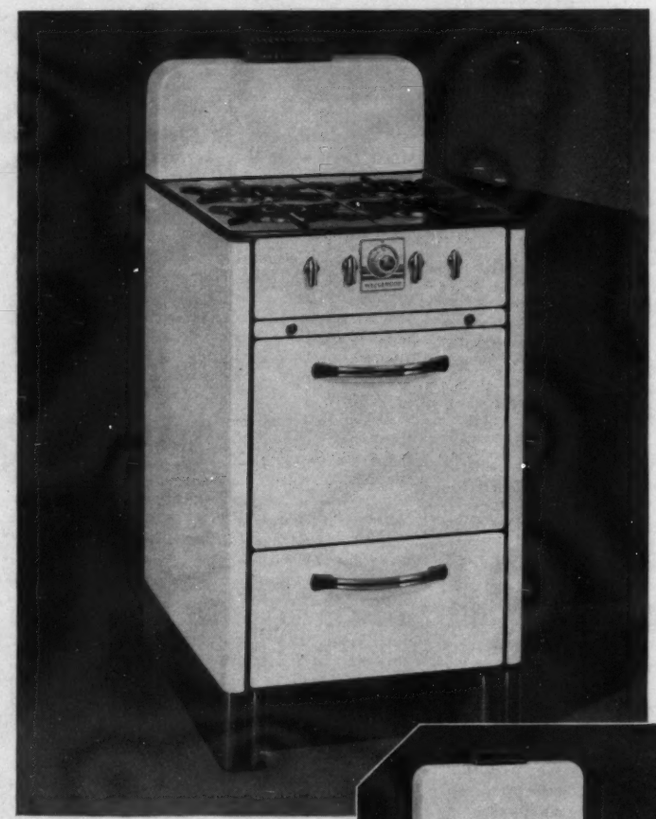
Otto Dice has been named street department superintendent of gas distribution to replace Mr. Ainsley.

■ ■

Sherburn Grants Franchise

The town of Sherburn, Minn., recently voted to grant the Peoples Natural Gas Co., Omaha, a 25-year franchise to serve natural gas to that community. The company plans to make natural gas available by November 1.

THE SMART NEW

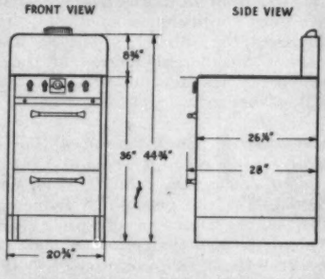


WEDGEWOOD BUFFET GAS RANGE

Wedgewood's New Buffet Gas Range is flexible to the demands of the modern hostess. Styled to fulfill her every desire and taste for finer things, its compactness and beauty are a compliment to every kitchen.

OUTSTANDING FEATURES

- ★ ONE GIANT AND THREE STANDARD BURNERS
- ★ SECTIONAL SPEED TOP
- ★ SELF-LIGHTING TOP BURNERS
- ★ HEAVILY INSULATED 16"x19" PORCELAIN-LINED OVEN
- ★ HIGH-SPEED LOW-TEMPERATURE OVEN BURNER
- ★ STOP-CATCH FLAT BAR OVEN RACKS—CHROME PLATED
- ★ REMOVABLE OVEN SIDE BRACKETS—CHROME PLATED
- ★ OVEN HEAT CONTROL
- ★ SMOKELESS BROILER PAN — FULL PORCELAIN ENAMEL
- ★ PULL-OUT BROILER WITH REINFORCED DROP FRONT
- ★ FULL FLUSH-TO-WALL CONSTRUCTION
- ★ STREAMLINE BACKGUARD WITH AUXILIARY SHELF
- ★ FULL PORCELAIN ENAMEL FINISH
- ★ RECESSED BLACK PORCELAIN BASE



Designed to Use Natural Manufactured or Bottled Gas

WEDGEWOOD THE MODERN GAS RANGE

JAMES GRAHAM MANUFACTURING CO. • San Francisco - Los Angeles - Newark, Calif. - Portland, Oregon

CURRENT Reading

• **IN THIS DEPARTMENT published for the first time in this issue, GAS presents to its readers resumes of recently published articles, papers, bulletins, and books dealing with the progress made by the industry in engineering, utilization, load-building, and management. This column will be a monthly feature in GAS.**

Recycling of Gas Following Completion Aids Recovery from Shoe-String Sand Field—Harry F. Simons. *Oil and Gas Journal*, March 9, 1939, pp. 44, 45. By recycling gas produced with oil immediately on completion of wells in southeastern Kansas, production can be maintained at a higher rate. In the operation more gas is injected than is taken from the wells, the extra gas being obtained from a gas well.

Maintain System of Records to Combat Pipe Line Corrosion — Frank E. Hangs. *Oil and Gas Journal*, April 27, 1939, pp. 25, 26, 113. A system of corrosion records is an indispensable aid to any pipe line corrosion program. It gives the necessary information to plan work effectively and economically; it serves as a check on corrective measures, and it provides the factual data necessary for management. Describes such systems.

Apparatus for Microanalysis of Gas —C. H. Prescott, Jr., and James Morrison, *Industrial and Engineering Chemistry*, Analytical Edition, April 15, 1939, pp. 230-233. This article describes modern refinements of apparatus and technique for the rapid analysis of minute amounts of gas. On samples of 5 to 25 cu. mm. at normal temperature and pressure, analyses may be made with errors for each component within 2 per cent of the total sample. The errors are within 5 per cent on quantities of gas as small as the proverbial limit of 1 cu. mm. The methods described are available for the gases, water, carbon dioxide, hydrogen, carbon monoxide, and oxygen or methane.

Hydrogen Sulfide Removal System—J. M. Mullen. *Petroleum World*, March, 1939, pp. 63, 80, 82. Tripotassium Phosphate process operates successfully in new plant. Flow diagram illustrates simplicity of design and operation. Typical daily operating statement given. Also in *California Oil World*, 1st March issue, 1939.

The Compression of Hydrocarbon Gases—A Thermodynamic Analysis—B. H. Sage and W. N. Lacey. *California Oil World*, 2nd April issue, 1939, pp. 22-24, 38-40. The application of thermodynamic data to the evaluation of compressor performance. If, for example, the fluid friction and energy rejected to the jacket can be correlated as a function of the average gas temperature, the rate of compression and possibly the viscosity of the gas, the performance of the compressor may then be estimated for any other fluid for which suitable thermodynamic data are available. If the indicator cards are available for the machine operating on the fluid in question, the maximum gas temperature may be predicted with accuracy and the indicated work compared with that obtained from the state of the entrance and exit gases. These methods are applicable to fluids which deviate materially from the perfect gas laws.

Residue Gas from Gasoline Plant is Returned to Two Producing Bands—J. H. Cable. *Petroleum Engineer*, April 1939, pp. 37, 38. The casinghead gas from the 54 producing wells in the Rhodes pool, Jack County, Texas, is being stripped of its gasoline content and the residue turned to the producing zone through 12 injection wells. For removing the gasoline content and compressing the gas to a pressure sufficient to return the gas to the producing sand a plant was placed in operation in April.

The Statistical Year Book No. 3 of the World Power Conference is obtainable from The American Society of Mechanical Engineers, 29 West 39th Street, New York City. (Price, $5.60 postpaid.)

This book contains statistics of the resources, production, stocks, imports, exports, and consumption of power and power sources in most of the countries of the world. One section of the volume is devoted to natural and manufactured gases. These statistics are presented in a series of tables which are both explicit and self-explanatory.

Recent Developments in Piston-Ring Materials—B. A. Yates. *S.A.E. Journal*, Feb., 1939, pp. 49-58. This paper concentrates on the material factors—such as composition, structure, and surface finish—which should go into the modern piston ring. The causes of piston ring wear are analyzed and classified under three headings—abrasion, corrosion, and erosion.

Protective Coatings for Metals—Dr. R. M. Burns and Dr. A. E. Schuh. Published by Reinhold Publishing Corp., 330 West 42nd St., New York City. (Price, $6.50.) The 408-page book deals with mechanism of corrosion, surface preparation, types of metallic coatings and methods of application, methods of testing, and such coatings as zinc, cadmium, tin, nickel, chromium, rare metals, paint, and miscellaneous.

The Removal of Hydrogen Sulphide from Gas Containing Oxygen—T. S. Bacon. *Petroleum Engineer*, Feb., 1939, pp. 70, 72, 73. Small concentration of the hydrogen sulphide, necessity for almost complete removal, and presence of carbon dioxide and oxygen were complicating factors in the treatment applied by the Lone Star Gas Co., whose removal process is described.

Limits of Inflammability of Gases and Vapors (Bureau of Mines Bulletin 279, revised)—H. F. Coward and G. W. Jones. A comprehensive survey covering the period from about 1800 to the present time has been made of the limits of inflammability of gasoline and benzol vapors, natural and manufactured gas, blast-furnace gas, hydrogen, acetylene and many other gases, a knowledge of which is of equal importance in the prevention of gas explosions and fires in the metallurgical, petroleum, gas-manufacturing, and related industries.

Copies may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. (Price, 20 cents.)

Air Conditioning—Charles R. Downs. *Industrial and Engineering Chemistry*, Feb., 1939, pp. 134-140. First in a series on this subject. Later papers will contain technical information covering various phases of the development.

Correlation of an Electrolytic Corrosion Test with the Actual Corrosiveness of Soils—Irving A. Denison and Robert B. Darnielle. *Journal of Research*, National Bureau of Standards, Dec., 1938, pp. 819-830. The corrosiveness of soils along a 128-mile section of a pipe line system was estimated from data on the occurrence of leaks and length of line reconditioned and from the results of an electrolytic corrosion test. The development of leaks with time as influenced by reconditioning is illustrated for soils differing in corrosiveness.

The Determination of the Probable Life of Line Pipe—Starr Thayer. *Petroleum Engineer*, Jan., 1939, pp. 81, 82. From records of past replacements and leaks a curve can be plotted showing repairs likely to be required, thereby aiding in planning a budget for maintaining line pipe.

Manufacture of Organic Chemicals from Natural Gas Hydrocarbons—Robert E. Vivian. *California Oil World*, 2nd Jan. issue, 1939, pp. 12, 13, 15, 16. Author surveys chief organic compounds now being manufactured in commercial quantities from the hydrocarbons found in natural gas and some of those compounds that may soon be produced from that source.

Study of Heat Transfer Rates in Commercial Exchangers—W. L. Nelson. *Oil and Gas Journal*, Jan. 19, 1938, pp. 40, 43. To clarify aspects of heat exchanger design which have been confusing to engineers, the author discusses the subject which he has studied over a considerable period of time, during which he has accumulated data on commercial exchangers.

Calculations of Back-Pressure Tests on Natural Gas Wells—J. William Ferguson. *Oil and Gas Journal*, Jan. 19, 1938, pp. 47, 48, 50, 53. For the purpose of reducing the number of operations in the process of making calculations in the course of making back-pressure tests, a simplification of method is presented which eliminates the necessity for some interpolations and furnishes the means for better interpretation of some features of the back-pressure curves.

An Explanation of the New Law of Design for Cast Iron Pipe as Developed by Committee A-21 of American Standards Association, prepared by research department, American Cast Iron Pipe Co., Birmingham, Ala., is an addendum to a paper by W. D. Moore, entitled, "Discussion of the New Law of Design of Cast Iron Pipe for Underground Service as Developed by Committee A-21 of American Standards Association," presented at American Gas Association Distribution Conference, 1939, in Chicago.

JOHN ZINK BURNERS

A Likely Pair

FLOOR FURNACE
50,000 B. t. u. Size . . . $32.50

CONVERSION BURNER
Furnace Burner Alone . . . $10.50

***Both Manufactured by* JOHN ZINK**
***and Approved by the* A. G. A.**

There have been installed 400 John Zink Floor Furnaces during this first year . . . they are 100% satisfactory.

Five thousand satisfactory conversion furnace burner installations prove that John Zink Burners are better!

Write, Wire or Phone

JOHN ZINK BURNERS—Tulsa-New York

Tulsa Plant — 4401 South Peoria Ave.

New York—342 Madison Ave.

View of the rejuvenated office of the Maquoketa Light and Heat Company

Rebuilding the Service and Load of a Run-down Utility

By ARTHUR J. SMITH

Maquoketa Light and Heat Company,
Maquoketa, Iowa

THE Maquoketa Light and Heat Co. operates to manufacture and distribute gas in the city of Maquoketa, a county seat in the eastern part of Iowa. At one time the company was quite prosperous, with 1059 services, 1000 meters and a density of 3.6 people per meter. The depresion, however, together with competing municipal and high-tension electric systems, four bottled gas sales agencies, and numerous oil and solid fuel supply houses, made operation very difficult for a carbureted water gas plant selling 535 B.t.u. gas at $1.90 per M c.f. The plant had been sliding backward for about six years and the 1000 meters had declined to a low of 502. The writer, having spent a good part of his life in the gas business, saw an opportunity to revive this plant, and accordingly acquired ownership and operation in August 1937.

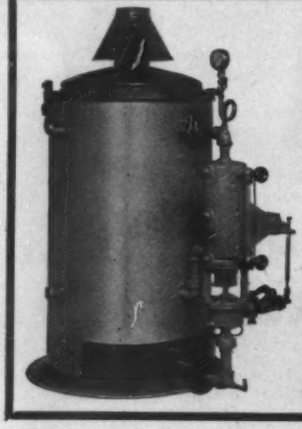
Before entering into a strenuous campaign for new business it was decided to raise the gas pressure for the full 24 hours to about one-half more than the holder pressure, and next to raise the B.t.u. to 700, to show the customers that they were getting real service and value for their money. With winter coming on, the next move was to put on a small heating campaign with enough customers to about double the send-out. This was not very profitable but it aroused customer interest, and had the practical and direct result of spreading the feeling that gas must be cheap if houses could be heated with it. This was followed with a display at the gas office every evening showing the various kinds of heating burners operating, which attracted great attention and afforded an opportunity to talk to the visitors about gas for cooking, baking, water heating and light house heating, and often to arrange a visit to their homes in the day time. This resulted in about one new job a day throughout the winter, either an addition to an existing customer, or a new customer back on an idle service.

As a next step the plant was modernized and decorated both inside and out. Trees were planted in the yard, buildings were repaired, an 80-ton cement stucco coal bin erected, and gas lighting installed to illuminate the front. The office was modernized with fixtures purchased from a closed-down bank, and lighted with gas arcs. The meter shop and fitting room were cleaned up, a new cement floor laid, and the meter tester overhauled. This gave the whole plant a prosperous appearance, calculated to inspire confidence in the company, and remove any hesitation that customers might have, in buying appliances, for fear that the service might again become impaired and they be left with expensive and useless equipment on their hands.

A Successful Campaign

During the next fall a useful appliance for load building was found to be the radiantfire heater. These were carried right into the home and set down in front of the customer, in an attempt to sell them on the attractive appearance in the fireplace, and on the advantage of instant heat when the furnace was down or before or when warming up in the morning. This campaign was quite successful, as many as five being sold in one-half day. It was surprising how the load was built up by this means, and how much of the load was retained in the fall that otherwise would have been lost due to hot water heating going back to furnace coils when furnaces were lighted.

As a result of these activities the writer was able to put in about 250 new customers and 366 jobs in a little



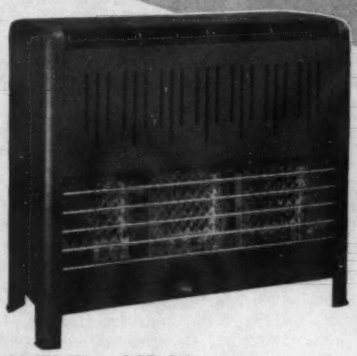
INDUSTRIAL GAS BOILERS

Plain tubular . . . . . ¾ to 10 H.P.
Water Leg tubular . . 5 to 45 H.P.
HE Flueless . . . . . 1 to 18 H.P.

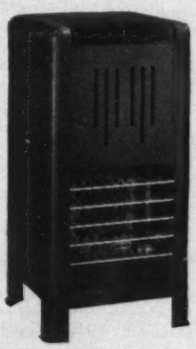
ASME Code for 100 lbs. S.W.P., also for higher pressures.
Non-electric Low Water Cut-offs for all types of boilers.

P. M. Lattner Mfg. Company
CEDAR RAPIDS IOWA

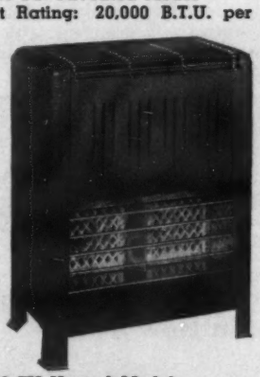
Announcing the HUMPHREY RADIANTFIRE CIRCULATOR



No. 60-CV Vented Model
No. 60-CU Unvented Model
Input Rating: 60,000 B.T.U. per hour



No. 20-CV Vented Model
No. 20-CU Unvented Model
Input Rating: 20,000 B.T.U. per hour



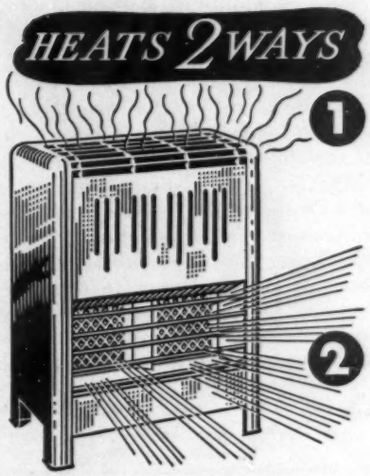
No. 40-CV Vented Model
No. 40-CU Unvented Model
Input Rating: 40,000 B.T.U. per hour

HUMPHREY Radiantfire Circulators are NEW and refreshingly different from all other gas burning Circulators. New styling, new, ingeniously designed heat-exchangers, new standards of heating efficiency, make these heaters outstanding values. They possess all the beauty, charm, and radiant heating efficiency of the famous Humphrey Radiantfire, PLUS THE ADDED ADVANTAGES OF WARM AIR CIRCULATED HEAT.

Humphrey Radiantfire Circulators are OPEN FRONT heaters. No closed fronts or other obstructions reduce the radiant heat output. ALL the radiant heat from the glowing elements is delivered directly into the room to warm instantly the floor and everything else in its path.

A complete range of sizes makes these circulators available to meet practically any heating problem. Homes, offices, shops, stores, restaurants, and numberless other places can be economically heated with these sturdy heaters.

All Humphrey Radiantfire Circulators are approved by American Gas Association Testing Laboratory as both VENTED and UNVENTED models, for use with Manufactured, Natural, Butane, and Propane gases.



Direct, penetrating sunlike radiant heat at the "sitting level" — fast-moving, convected heat to circulate up and around for quickly warming the entire room — that's the HEAT story of these new OPEN FRONT Humphrey Radiantfire Circulators. Prospects can easily understand this simple sales demonstration when you have a Radiantfire Circulator on your sales floor.

Send for Complete INFORMATION

This new Bulletin shows the Radiantfire Circulators in full color and gives complete sales information. Send for Bulletin RC-39-2.

GENERAL GAS LIGHT COMPANY

KALAMAZOO, MICHIGAN

23 Warren St., NEW YORK CITY 2nd Unit Santa Fe Bldg., DALLAS 475 Eleventh St., SAN FRANCISCO

over a year, and now has in the neighborhood of 750 customers with the number still increasing. Just recently a local man was employed who goes from house to house adjusting appliances (which gives him entry because the service is free), and while doing so checks on sales opportunities, makes sales where he can and collects delinquent bills. He is paid a small salary, with a commission on sales, and an additional commission for each new customer and each collection of a delinquent bill. His contacts are considered better than advertising as he can make a personal and direct appeal.

As an additional activity it has been found profitable to seek business outside of the ordinary heating, cooking and water heating appliances. For instance, an egg hatchery was converted to gas to provide a profitable six months load. The fuel bill is no more than with the coal previously used, and there is great advantage in that the gas equipment is fully automatic whereas the coal fire had to be attended to during the day and at midnight. Such installations are very useful in helping to overcome the loss of revenue suffered by retaining customers on minimum bills during the slack season of the year.

U.S.H.A. Decisions Favor Gas Over Electricity for Cooking

OF the 39 U. S. Housing Authority projects upon which decisions have been reached on utility service, 26 will use gas and five electricity for cooking, according to information collected by the American Gas Association. On the other hand, but four of the 39 will use gas for refrigeration and 21 will use electricity. The local office of the Housing Authority is given the major responsibility for making selection of fuels.

The latest list of local authorities in the Pacific Coast-Southwest area include Phoenix, Ariz.; Los Angeles (city and county), Santa Monica, Oakland and San Francisco, Calif.; Clackamas County, Ore.; Everett and Seattle, Wash., and Honolulu, Hawaii.

In San Francisco the Holly Park project has been authorized to advertise bids and one more is awaiting approval of plans and specifications. Oakland has two projects, and Honolulu one project, awaiting approval. The Carmelitos project in Los Angeles county is ready for bids.

■ ■

Three Gas Producing Areas Found in Oklahoma in 1938

Out of 42 discovery wells drilled in Oklahoma in 1938, three produced gas and the remainder oil, E. F. Shea, Stanolind Oil & Gas Co., Tulsa, Okla., told delegates attending the Twenty-fourth Annual Meeting of the American Association of Petroleum Geologists, held in Oklahoma City, March 22, 23, and 24.

Although 2000 wildcat wells were completed in Oklahoma during that year, only 220, or 11 per cent, might be classified as exploratory wells, Shea said. As a result of the drilling of these 220 exploratory wells 42 new producing areas were discovered.

■ ■

'Gas On Parade' to Highlight P.C.G.A. September Meeting

THE splendid $150,000 gas industry exhibit at the Golden Gate International Exposition will be of special interest and appeal to those who will attend the annual convention of the Pacific Coast Gas Association in San Francisco Sept. 6-9. "Gas on Parade" will be the underlying theme of all programs and activities.

F. F. DOYLE

F. F. Doyle, manager of the Natural Gas Division of Pacific Gas and Electric Co., has accepted the position of general convention chairman, and the Fairmont Hotel has been designated as the official headquarters of the meeting. Prominent among those who will be active in the direction of the convention, in addition to Mr. Doyle, are K. C. Tomlinson, Pacific Meter Works, chairman of entertainment committee; E. J. Hinchey, Jas. Graham Manufacturing Co., chairman of golf committee; A. C. Joy, Pacific Gas and Electric Co., editor-in-chief of the convention newspaper; C. B. Babcock, chairman of special committee to arrange a public program for Sept. 9, which is Gas Industry Day at the Fair, assisted by R. E. Fisher as chairman of the gas exhibit committee; E. C. Wood, transportation; A. J. Noia, registrations; P. E. Beckman, properties; and V. J. Thompson, banquet.

■ ■

Divisions of New England Gas Association Meet

The operating and sales divisions of the New England Gas Association recently held meetings at Hartford, Conn., and Boston, Mass., respectively.

The operating division meeting was divided into production and distribution sessions. R. J. Rutherford, president of the Association, delivered the keynote address, "The Association Servicing Program."

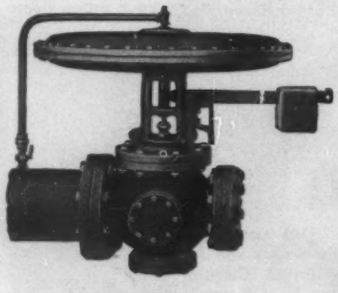
At the sales division meeting Robert J. Canniff, sales promotion manager, Ruud Manufacturing Co., and Robert S. Agee, sales promotion manager, A.G.A.E.M., were the principal speakers. A 30-minute sound film, "Straight to Your Heart," sponsored by the A.G.A.E.M., featured the indirect method of selling the CP range.

■ ■

CP Range Program Managers To Meet in New York

The first annual meeting of the regional and associate regional managers of the CP Range Program of the A.G.A. will be held July 12 and 13 in the Auditorium of Gas Industries Building at the New York World's Fair, it has been announced by F. M. Houston, chairman, Domestic Range Committee. The Program, sponsored by the Domestic Range Committee, was officially inaugurated August 1, 1938. Members of the Committee, all CP range manufacturers, and executives of a number of nearby gas companies, will be invited to attend.

Easily Installed. Control Sure. Valve Seats Easily Replaced.



FULTON
Low-Pressure Regulator

Easy installation, easy replacement of valve seats when needed, and unfailing reduction of comparatively high pressures to suitable pressures for use—even very low pressures if required—are advantages of the Fulton Low-Pressure Regulator. Changes of pressure on the inlet side have no effect on delivered pressure, which is kept constant. When valve seats become worn, they can be replaced without disturbing the body of the regulator. Simple directions are furnished. Descriptive Bulletin No. 1150 will be mailed on request—also catalog of Chaplin-Fulton regulators for all gas-control uses.

The CHAPLIN-FULTON MFG. CO.

28-40 PENN AVE. CF PITTSBURGH, PA.

ROPER GAS RANGE OLD STOVE ROUND-UP SALE

A Field-Tested Sales Plan STREAMLINED FOR YOU—NOW!

LET THE 4 ROPER RANGERS STEP UP SALES

Eleven years ago Roper originated the Old Stove Round-Up plan. Year after year since then many Roper outlets have used the Round-Up with splendid success.

While retaining all of the soundness and appeal of the original Round-Up idea, the current campaign is fresh and interesting. The Round-Up Sale continues as one of the finest merchandising plans ever conceived.

These four hard-ridin' straight-shootin' Roper Rangers will help you conduct an outstanding gas range sale featuring new Ropers.

If you have not received the complete Roper Old Stove Round-Up Sale presentation, write for it today. You'll find newspaper ads, display, pennants, streamers, envelope inserts, dodgers, contest suggestions, and many other worthwhile items available for your immediate use. The Roper Round-Up Sale will help you hit a new high in gas range selling. Try it.

GEO. D. ROPER CORPORATION

GENERAL SALES OFFICE AND PLANT: ROCKFORD, ILL.

WAREHOUSES:

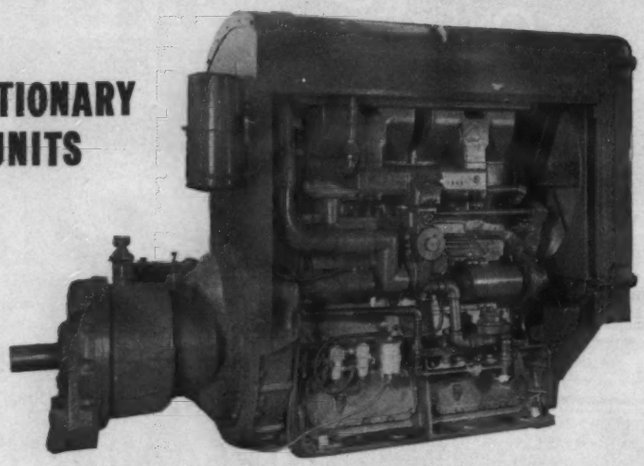
Chicago: 343 So. Dearborn Street—Atlanta: 901 William Oliver Building—Los Angeles: 2481 Porter Street
Dallas—Cincinnati—Brooklyn—Danbury, Conn.—San Francisco—Kansas City—Newark—Boston
Washington—Cleveland—Philadelphia—Roanoke

USE ROPER SALES PROMOTION PLANS

ROPER RANGES ARE IDEAL FOR USE WITH ANY TYPE OF GAS, INCLUDING BOTTLED GAS

ENSIGN CARBURETION EQUIPMENT

FOR STATIONARY POWER UNITS



Suitable for use with Natural or Manufactured Gas. ENSIGN Gas and Combination Gas and Gasoline Carburetion Equipment is standard with all leading engine manufacturers.

ENSIGN CARBURETOR CO., LTD.
LOS ANGELES • DALLAS • CHICAGO

BUTANE-PROPANE News

THE CLEARING HOUSE *for* NEWS AND INFORMATION ABOUT . . .

Transportation and Storage
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BUTANE-PROPANE News
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Please enter my name as a subscriber to BUTANE-PROPANE News.
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SUBSCRIPTION RATES—United States, Canada, Mexico, Cuba, South and Central American Countries, three years for $2.50. All other countries, $3.00 per year.

Tribute Paid To Inventor Of Gas Illumination

A TRIBUTE to William Murdoch, the man who made the first practical use of gas as an illuminant, was presented by John McLaverty, superintendent, Sales Promotion Department, The Consumers' Gas Co. of Toronto, at the convention of the Canadian Gas Association held in Hamilton, Ontario, June 6-7. Mr. Murdoch died 100 years ago.

Born in Scotland in 1754, Mr. Murdoch was first employed in Cornwall by Boulton & Watt, the latter being credited with inventing the steam engine. In this position he worked on machinery in the mines, and in his spare time invented the "sun and planet motion" in an engine, and also worked with Watt in the development of the steam engine.

In 1808, Murdoch received the Rumford Gold Medal presented by the Royal Society for his paper on the subject of lighting by coal gas. In this paper he stated that in 1792 he had first discovered that gases could be used for illumination, but had not taken out a patent. Six years later his apparatus was improved to the point where several offices in Scotland were lighted by means of gas.

■ ■

Casey, Ill., to Have Natural Gas by Last of August

The city of Casey, Ill., will have natural gas available by the last of August, as the result of a State charter that has been issued to the Casey Natural Gas Co., according to J. L. Hassett, who will be in charge of the company's office.

An order has been placed for eight miles of pipe. Gas will be secured from local wells and piped directly to Casey residents through a distribution system to be installed under a franchise issued in 1937.

■ ■

Milwaukee Gas Light Co. Absorbs Four Utilities

The Wisconsin Public Service Commission has recently approved the merger of the Wauwatosa (Wis.) Gas Co., West Allis (Wis.) Gas Co., Lake Shore Gas Co., Whitefish Bay, Wis., and Wisconsin Eastern Gas Co., Milwaukee, with the Milwaukee Gas Light Co.

The transaction will increase the amount the Milwaukee Gas Light Co. has in utility plants from $26,829,370 to $29,480,554, and is expected to reduce rates to suburban customers served by the affiliated companies.

■ ■

Madison Utility Appoints Secretary and Treasurer

George E. Wagner, formerly statistical engineer for the Madison (Wis.) Gas and Electric Co., has been named treasurer and assistant secretary. R. C. Stumpf, who has been assistant secretary, has been elected secretary and assistant treasurer of the company.

Both appointments were made following the resignation of Secretary-Treasurer Jerome J. Feeney, who is now vice president of Interstate Power Co., Dubuque, Iowa.

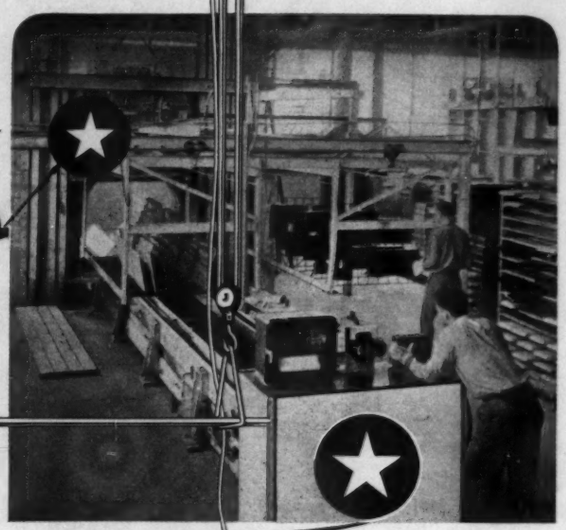
■ ■

W. J. Deakins and R. H. Gray Exchange Texas Positions

M. L. Bird, division superintendent of the Community Natural Gas Co., has announced that W. J. Deakins succeeded R. H. Gray as manager of the Abilene, Texas, office of the company. Mr. Gray, in turn, has become manager of the Waco, Texas, office of the Texas Cities Gas Co.

P.C.G.A. PREVIEW

COOPERATIVE LOAD-BUILDING



2½ MINUTES AT 1520 DEGREES ✪ WITH GAS

★ "STAR" OF THIS AD IS THE O'KEEFE & MERRITT APPLIANCE FACTORY IN LOS ANGELES. AGAIN, GAS FUEL PRESENTS A TRUE PICTURE OF EFFICIENCY AND DEPENDABILITY, TO READERS OF INDUSTRIAL AND BUSINESS PUBLICATIONS. ★

"No chance for slips, with gas operation," says W. J. O'Keefe, of O'Keefe & Merritt, Los Angeles appliance manufacturer. "With fully-automatic gas ovens, we can do all our enameling—economically and efficiently." ★ Production mounts at times to 125 ranges a day, but no matter what the schedule, the gas ovens never vary. ★ Either standard or special heating equipment operates best with gas. You are invited to consult your Gas Company engineers, free of charge.

O'Keefe & Merritt Co., Los Angeles, operates its three gas-fired enameling ovens 24 hours a day. Parts for gas ranges, circulating heaters and refrigerators are "treated" with uniform speed and precision possible only with gas fuel. Twelve chrome plating tanks are also gas-fired.

AT SAN FRANCISCO WORLD'S FAIR you and your family can obtain new ideas for kitchen design and modern home utilization of gas fuel. Gas Exhibit, Homes and Gardens Palace.

QUICK · CLEAN · CONTROLLABLE · DEPENDABLE · ECONOMICAL

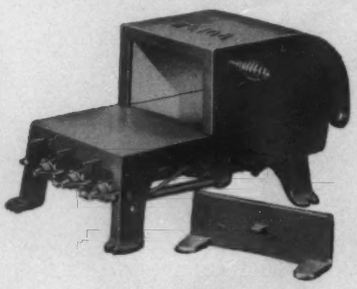
GAS
THE MODERN FUEL

P. C. G. A.
H. L. Farrar, President
Clifford Johnstone, Managing Dir.

JULY
1939

COMMITTEE
A. C. Joy, P. G. & E.
J. S. Spaulding, So. Calif. Gas Co.

JOHNSON'S No. 108 FURNACE Heats Quickly at LOW COST

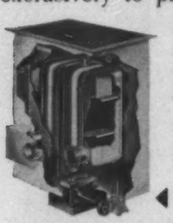


Get quick, uniform heat at lower cost with this famous three-burner Johnson bench furnace. Uses all types of gas, economically without blower or forced draft. Gives fast heating of largest soldering coppers, branding and stenciling irons. Refractory lined for ideal heat treating of carbon steel tools and parts. Write today for FREE catalog.

JOHNSON GAS APPLIANCE Co.
Cedar Rapids IOWA

Payne SELLS GAS!

When you sell a Payne Furnace you sign up a satisfied gas consumer for life! A quarter of a century devoted exclusively to precision construction and engineered design of gas fired appliances means carefree heating for the user, a *permanent gas load for you.*



◀ The Payne Floor Furnace

There is a Payne Gas Furnace for every heating need

FLOOR FURNACES • FORCED AIR UNITS
CONSOLES • WINTER AIR CONDITIONERS
DUPLEX FURNACES • GRAVITY FURNACES

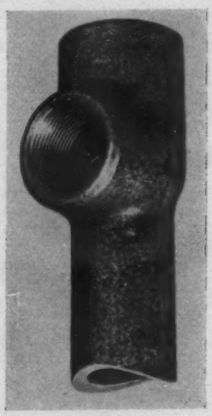
Write for information

PAYNE Furnace & Supply Co., Inc.
BEVERLY HILLS, CALIFORNIA

MODERN *Products*

Forged Welding Tee

M. B. Skinner Co., South Bend, Ind.
Model: Skinner-Seal Forged Welding Tee.
Description: The new Skinner-Seal Forged Welding Tee is an extra heavy fitting of forged steel, filling the need for a welding



street tee. It is made in 1-in. and 1¼-in. sizes, and the top can be threaded with inside or outside pipe threads, or socket bored for plain-end pipe to be welded in. The base end contacting the main is milled to the radius of the main and can be furnished optionally so outlet is parallel to or at right angles to the main.

The tee can be fitted at extra cost with the Skinner-Seal safety check valve at the top for cutting in on high pressure lines without shutting off the pressure.

■ ■

Stainless Steel Electrodes

The McKay Co., York, Pa.
Description: A complete line of stainless steel electrodes covering all chemical analyses. Each package contains a certification of weld deposit analysis rather than the wire analysis used in the past. The electrodes are claimed to make instant contact upon restriking arc; to allow easy removal of slag; spatter free within practical limits; make exceptionally smooth bead with perfect weld contour; have all alloys contained in core wire.

A 16-page booklet describing the certification process of weld deposit analysis and the welding procedure for the various stainless steels may be obtained by writing the sales office of the manufacturer.

■ ■

Oil and Gas Boiler

P. M. Lattner Manufacturing Co., Cedar Rapids, Iowa.
Description: A combination oil-fired and gas-fired boiler of the industrial type for 100 lb. maximum SWP, for use in laundries, cleaning establishments, tire rebuilders, dairies, bake shops, etc. The boiler is the regular Lattner oil-fired vertical tubular or vertical flueless with refractory combustion chamber. No changes are necessary in the boiler proper for conversion from one fuel to the other. The oil burner is a motor-driven gun type burner for operation on N. 3 fuel oil or better. Operation of the burner is controlled by a steam pressure switch, and equipment includes a safety stack switch. The oil burner is designed so that with the replacement of a few parts and the addition of a motor valve and gas pressure regulator it will operate as a blast type gas burner. Tests have shown that the thermal efficiency of the boiler-burner unit is equally high with either fuel. With a gas line and an oil line completely installed and available to this burner, the change-over can be made in a very short time.

■ ■

Iron Pipe Catalog Issued By Republic Steel Corp.

The Republic Steel Corp., Cleveland, Ohio, has recently issued a 44-page catalog entitled "Toncan Iron Pipe for Tough Service." The booklet describes Toncan copper molybdenum iron pipe and covers such subjects as the electric weld process of manufacture; rust and corrosion resistance; recommended applications; details of various tests; physical properties; threading procedure; welding; sizes and weights; outstanding installations and service records in specific fields; how to specify and order; where to buy, and other information.

■ ■

General Controls to Open Branch in Kansas City

General Controls Co., Glendale, Calif., manufacturers of automatic temperature and flow controls, announces the establishment of a branch office at 3626 Wyoming St., Kansas City, Mo. Edmund V. Bialik, sales engineer, will be in charge of this office.

General Controls also maintains factory branch offices in New York, Chicago, Detroit, Cleveland, Houston and San Francisco.

■ ■

Flexible Coupling Described

A new bulletin (No. V-129) on flexible couplings has been issued recently by the Merco Nordstrom Valve Co., Pittsburgh, Pa. The bulletin gives complete information about the valves, each of which is illustrated by a photograph and line drawings. Copies may be obtained from the company.

■ ■

Kentucky Town to Have Gas

A 20-year franchise to furnish natural gas to the city of Elizabethtown, Ky., was recently purchased by F. E. Scott of Kansas City, Mo. The gas will be furnished by the Kentucky Natural Gas Co. to approximately 400 customers. Service will commence next fall, Mr. Scott stated, or as soon as the distribution system is completed.

■ ■

John Zink Opens in Chicago

The John Zink Co., Tulsa, Okla., has announced the establishment of a Chicago office, June 1, at 7309 East End Ave. A. J. Foley, formerly sales manager for Hanlon-Waters, Tulsa, will be in charge of the new office.

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

GAS APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

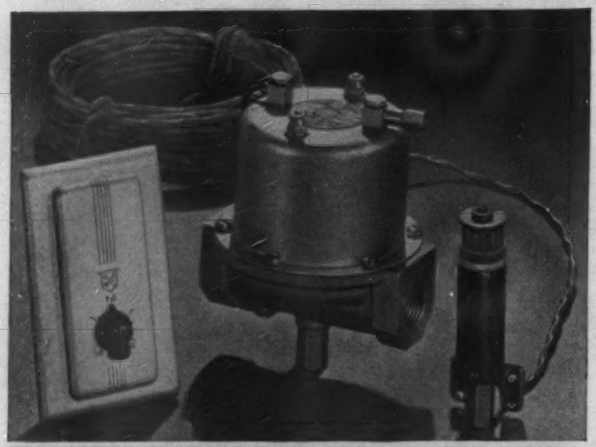
1939 SUMMER SPECIAL ON GAS HEATING EQUIPMENT

IF YOU SELL gas heating equipment, this is your campaign as well as ours. Use it! Write your advertisements around the central theme of a 10% summer discount, deferred monthly payments and a careful, unhurried job—then arrange to have your advertisements published alongside of ours, where each will complement the other. If you want to tie in with our poster and billboard advertising—and you should—see our local office about a supply of blotters and truck banners. These materials are 4-color reproductions of the company's own posters, but without our signature. And the little that is charged for them is only enough to prevent waste. Get in touch with our local office—today!

G 207,739

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Gas Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Gas Appliance Society, 1355 Market Street, San Francisco, California.

YOU MUST INVESTIGATE THESE AMAZINGLY SUCCESSFUL CONTROLS TODAY



NO ELECTRICITY NEEDED
IT GENERATES ITS OWN CURRENT

★This is the GENERAL CONTROLS T-85 PACKAGE SET the logical and *most popular* control for ALL gas heating appliances.

THERE'S NOTHING ELSE LIKE IT!

SEND TODAY FOR OUR NEW CATALOG

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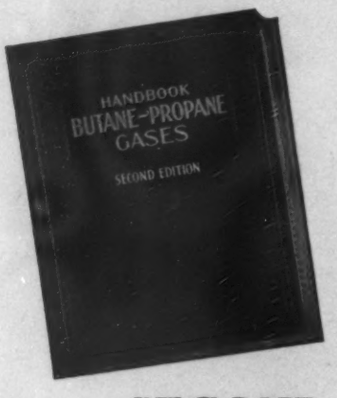

CONTENTS: Semi-Bulk Distribution: Use of Butane in Buses: Combination Propane Operated Utility Plant: Use in Internal Combustion Engines: Design & Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economical Comparisons with Coal, Oil, Electricity, Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Special Uses: Volume Correction Factors: Transportation: Use with other Gases: Analysis & Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalog Section.

SECOND EDITION (Revised November, 1938)

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GAS

The NATIONAL Gas Magazine

OIL & GAS Equipment Review, 810 S. SPRING ST. Los Angeles, Calif.

Six Million To Be Refunded to P. G. and E. Customers

THE Pacific Gas and Electric Co. will refund almost $6,000,000 to approximately 470,000 customers in northern and central California who were being supplied with natural gas between July 16, 1933, and April 30, 1936, it has been announced by James B. Black, president of the P. G. & E. This sum covers revenues in dispute during those years as a result of the company's application to the United States District Court for an injunction restraining the enforcement of a gas rate reduction ordered by the California Railroad Commission. The period in which the disputed revenues were collected ended on April 30, 1936, when the company voluntarily reduced its rates to those fixed by the commission in the order complained of.

P. G. & E. has notified the commission that it has decided not to continue with the litigation and will refund the disputed revenues, with interest at 4 per cent per annum, at a time to be determined by the District Court, which will retain jurisdiction of the case for the purpose of supervising the refunds.

Preparations for the actual payments will require several months of detailed work, because from 35 to 40 million computations must be made in calculating the individual amounts to be refunded to the almost half a million customers.

■ ■

Vocational Training Offered San Diego Service Men

To aid gas appliance service men, the San Diego, Calif., school department is offering an evening course which includes instruction in combustion, appliance adjustment, pipe fitting and general gas distribution methods. Six weeks of training is the schedule for men with some experience and a 12 weeks' course is provided for beginners.

C. P. de Jonge, chairman of the Pacific Coast Gas Association distribution committee, is one of the instructors.

■ ■

Natural Gas Service Being Extended to Central, N. M.

Natural gas service will be made available in Central, N. M., the first part of July by the Lea County Gas Co., it has been announced by C. C. Tucker, vice president and general manager of the gas company. The gas will be delivered through the newly completed pipe line extension from Hurley, N. M., to Bayard. The company has recently commenced serving gas to Bayard and Fort Bayard Veterans hospital.

■ ■

So. Calif. Gas Co. Names Renz Head of Customer Service

Carl A. Renz, identified with the gas and oil industry since 1918, has been promoted to the position of superintendent of customer service department by the Southern California Gas Co. Entering the gas distribution department of the Los Angeles Gas and Electric Corp. in 1927 as an assistant engineer, he has since occupied the positions of general foreman and assistant superintendent. His new duties were assumed on May 1.

■ ■

J. B. Houston Promoted

J. B. Houston, formerly service representative for the County Gas Co., of Dallas, Texas, has been named district manager in charge of Arlington and Grand Prairie, according to an announcement by Wesley F. Wright, vice president and operating manager of the company.

Southern Union Appliance Sales Top $1,000,000 in 1936-38 Period

CUSTOMERS of the Southern Union Gas System, operating in Texas, Oklahoma and Arkansas, have shown a continuing preference for gas-burning equipment during the past three years (1936-1938) that has resulted in the sale of over one million dollars' worth of gas appliances during that period.

The table below indicates the number of units and average prices of the appliances sold during 1936-38.

Item	*Units Sold*	*Average Price*
Cookers	399	$ 15.32
Ranges	4,652	88.32
Water Heaters	3,192	58.68
Space Heaters	4,334	13.04
Circulators	1,642	29.62
Floor Furnaces	1,035	99.35
Radiators	205	70.33
Conversion Burners	299	96.66
Central Furnaces	110	276.32
Unit Heaters	168	204.61

■ ■

George Forster Elected President of Southern California Meter Group

George H. Forster of the Texas Co., Long Beach, Calif., was elected president of the Southern California Meter Association at its June (annual Low Jinx) meeting at the Van Matre Inn, Huntington Park, Calif. Mr. Forster succeeds Harry A. Faull of the Southern Counties Gas Co.

Mr. Faull presided over the final meeting of the fiscal year which saw the election of the following panel of supporting officers: vice president, M. J. Cereghino, Southern California Gas Co.; treasurer, W. W. Williams, O. C. Field Gasoline Corp.; secretary, G. S. Duncan, General Petroleum Corp. The chairmen named to head committees during 1939-40 were as follows: program, A. A. Fomilyant, Pittsburgh Equitable Meter Co.; entertainment, James Dunn, American Recording Chart Co.; standards, H. Schumacher, Standard Oil Co.; publicity, A. C. Staat, Natural Gas Equipment Co.; membership, L. W. Wilbern, Paramount Manufacturing Co.; by-laws, E. L. Cheever, Southern Counties Gas Co.

Featured attraction on the Low Jinx program was Skipper Joseph Dixon, well known author and explorer, who entertained the membership with stories of his adventures as a diamond prospector, Abyssinian explorer, and sailor.

■ ■

A.G.A.E.M. Publishes Water Heater Manual for 15,000 Architects

The Association of Gas Appliance and Equipment Manufacturers has recently released a manual on domestic hot water systems to 15,000 architects and builders as part of the national promotion campaign now being projected by the Association's gas water heater division.

The manual gives to the architect and building designer practical working data in his job of selecting the type of automatic gas water heating equipment most appropriate to the conditions surrounding any project.

The manual contains information and tables on such details as heater flues and chimneys; leaking faucets, fittings and attachments, etc. There is also a section on specifications for the hot water system covering requirements of the average domestic hot water system.

■ ■

Texas Panhandle Gasser Is Called The World's Largest Producer

Magnolia Petroleum Co., Dallas, Texas, was officially declared the owner of the world's largest gas well at the start of the Natural Gas Section meeting of the American Gas Association in Tulsa, Okla., on May 9. Frank B. Long, vice president of the Oklahoma Natural Gas Co., revealed the facts.

The well was completed on Feb. 15, 1938, at 4450 ft., for an estimated 203,000,000 cu. ft., and was later computed as making 224,000,000 cu. ft., with a rock pressure of 1650 lbs. under original spring gage test. The U. S. Bureau of Mines, applying back pressure method, reported it was good for 640,000,000 cu. ft., and that exceeded by 140,000,000 ft. the previously largest gasser. It is located in the Panhandle field of northwest Texas.

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The Use of Alcohol to Prevent Water Freezing in Gas Lines

COMMERCIAL alcohol, such as used in automobile radiators, has been used successfully during the past winter by the Zenith Gas System, Inc., of Alva, Okla., for preventing freezing of water in gas lines and regulators, according to W. Lee Woodward, president of the company.

Mr. Woodward credits the adaptation of such alcohol as an anti-freeze in lines to C. W. Mann, of Alva, superintendent of the company. Mann said that the regular gas odorizing equipment used regularly by his company is utilized during cold weather in winter months to inject the alcohol in the lines.

The odorant is removed from the equipment and replaced by alcohol. The equipment is set to automatically feed alcohol into the lines at the proper rate, bearing in mind the constituency and moisture content of the gas, and atmospheric temperatures. In extremely cold weather about 4 gals. of alcohol are used to each 1,000,000 cu. ft. of gas, Mr. Mann said.

The flow of alcohol into the lines is regulated by a precision valve on the odorizer orifice plate in the line, and works altogether off the differential. As the rate of flow increases or decreases, the injection rate of alcohol varies in the same proportion.

Commercial alcohol often is injected by hand by various companies to prevent stoppage from freezing, but the idea of using standard odorizing equipment for automatic injection of alcohol in gas lines and regulators is original with his company, according to Mr. Mann. His discovery that the weight of the alcohol is practically the same as the weight of an odorant used inspired the idea of injecting alcohol through odorizing equipment.

Mr. Mann further states that use of this method has stopped all trouble of freezing in lines and regulators, and that it is economical and requires very little time.

Zenith Gas System, Inc. has 120 miles of main transmission lines, serving the following towns: Hardtner, Kan.; Alva, Cherokee, Avard, Waynoka, Mooreland, Quinlan, and Woodward, Okla. W. L. Woodward, Alva, is president, and Lewis Robertson, Woodward, is vice president of the company.

■ ■

Julian Garrett Will Head Canadian Gas Association

THE Annual Convention of the Canadian Gas Association was held at Hamilton, Ontario, June 6 and 7, with a large group of Canadian and American utility operators and accessory manufacturers in attendance.

T. P. Pinckard, retiring president of the Association and vice president and general manager of the United Gas and Fuel Co., Hamilton, presided at all sessions. The following officers were elected for the year:

President, Julian Garrett, general manager, Northwestern Utilities, Ltd., Edmonton; first vice president, J. B. McNary, general manager, Canadian Meter Co., Ltd., Hamilton; second vice president, John D. Price, manager, Montreal Coke and Manufacturing Co., Montreal; secretary-treasurer, G. W. Allen, gas survey engineer, Toronto.

It was announced by the Time and Place Committee that the 1940 convention would be held in Jasper Park Lodge, Alberta, July 3, 4, and 5.

■ ■

Conspicuous Service Will Be Rewarded by A.G.A. Medal

According to an announcement made by Maj. Alexander Forward, managing director, A.G.A., "employes of gas or manufacturing company members of the A.G.A. who have displayed, during the year ending June 30, meritorious and conspicuous judgment, intelligence or bravery in saving human life in the plant or works of a gas undertaking, while handling the materials or products or manufacture or while distributing the products, are eligible to receive the A.G.A. Meritorious Service Medal."

Applications for the award must be made to A.G.A. by August 1, next, upon forms which may be secured upon request, and the award, consisting of a gold medal, a button and a certificate, will be presented at the convention in New York City in October.

■ ■

Work Starts On New Home Of Texas Cities Gas Co.

Construction of a new office building in Galveston, Texas, for the Texas Cities Gas Co. started May 26. When completed in early November, as expected, the cost will be $53,500. Summer and winter air conditioning will be featured in the construction.

A modern gas operated plant will be housed in an auxiliary building at the rear of the new building, connected by means of a passageway which will permit public inspection. The power room will serve as a demonstration plant of particular interest to industrial gas engineers.

■ ■

Community Natural Makes Personnel Changes

The following transfers of sub-district managers in the West Texas Division of Community Natural Gas Co. have been announced by L. B. Denning, Jr., vice president.

Frank L. Breaux will go to Merkel; Arthur H. Lawson has been transferred to Munday from Merkel; Porter W. Bryan will go from Munday to Seymour, and Walter E. Cooper, formerly at Seymour, will be at Knox City.

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Open furnace doors rob conversion burners of efficiency, cause customer complaints. This Inland Door Closer keeps furnace door firmly and securely shut. When the door is blown open, this device automatically and unfailingly closes it again. No conversion burner 100% efficient without this protection. Strongly made, cadmium plated, provided with wedge to hold door open when desired. Write for bulletin describing in detail this and other money-saving Inland Gas Specialties.

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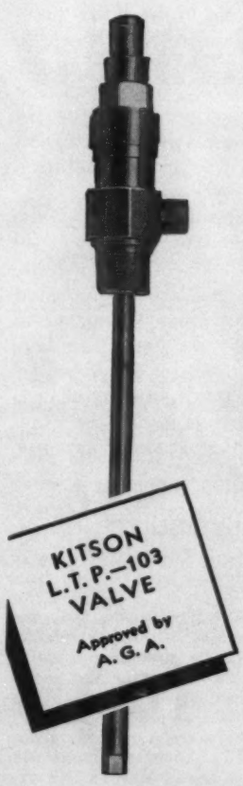
ELECTRIC SWITCH SERIES 600

Take No Chances!

It's Dangerous To Rely Only on Pressure Relief For Domestic Water Heaters . . .

Temperature Limitation Is Essential!



Years of exhaustive study, research and compilation of data obtained under test and actual service conditions . . . proved a contention, long held by Kitson, that pressure relief on domestic gas water heaters is NOT alone sufficient — that, rather, true emergency relief depends upon temperature limitation.

That principle, so thoroughly demonstrated, dictated that the entire line of Automatic Controls made by Kitson (under Lovekin Patents) be designed for thermal operation—FOR POSITIVE EMERGENCY RELIEF.

We will be glad to send you very interesting literature based on our investigation of the subject of temperature limitation. Write today and it will be forwarded promptly.

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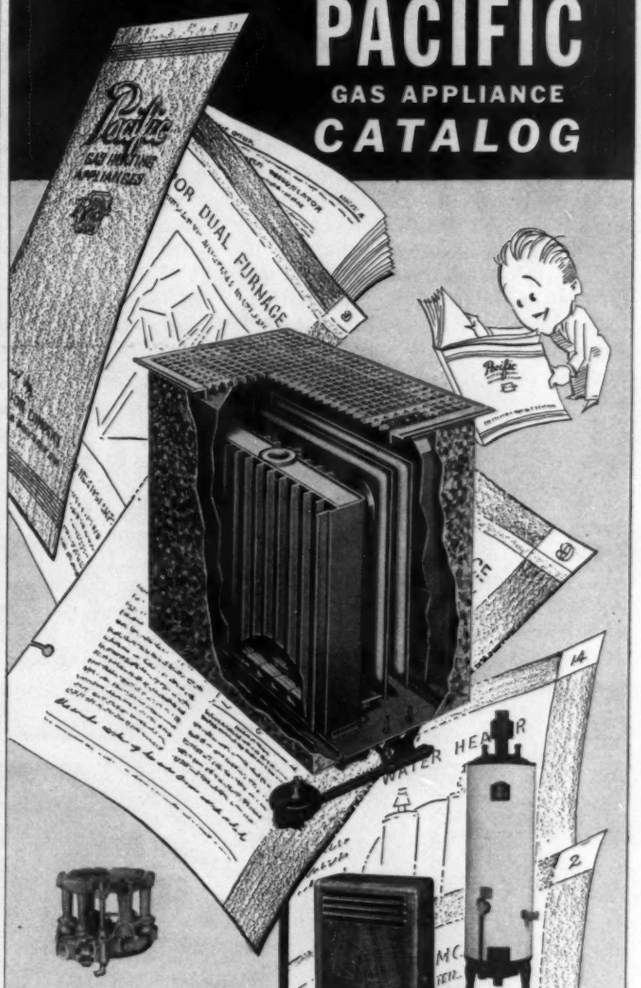

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Pacific

BASEMENT FURNACES • UNIT HEATERS

Gas Processing Operations

(Continued from Page 23)

quickly bleed off pressure from the engine fuel header when pressure on its diaphragm is released. Emergency valve (15) is a three-way valve, with its diaphragm connected to the separator float pilot. Normally it simply passes pilot pressure to the diaphragms of valves (13) and (16), holding them open and closed respectively, and thus permitting the engines to run. If the level in the separator should rise dangerously high, the float pilot will deliver a pressure to the diaphragm of three-way valve (15) sufficiently high to cause it to operate, shutting off the supply of pilot gas from valve (14) and at the same time releasing pressure from the diaphragms of valves (13) and (16). This shuts off the supply of engine fuel, and also instantly blows down the pressure in the engine fuel header, stopping the machines. Valve (17) is normally closed but can shut down the engines in the same manner, as will be discussed.

The other unusual safety arrangement in the plant is the provision of three emergency shut-down stations, from any one of which an operator, by simply turning a lever, can shut off all gas supply into the plant, blow down the pressure in the plant system, and shut down the compressors. It was felt that such arrangements were desirable on account of the high pressures and large volumes being handled; the volume averaging around 50 MM c.f. per day, and the pressures ranging up to 1800 lbs. on the suction and 3000 lbs. on the discharge of the compressors.

The manual emergency shut-down can be operated from any one of three stations, one of which is located in front of the plant office, another in the yard near the auxiliary building, and the third on the instrument panel in the compressor house. Each control station (one of which is indicated at (18) on the diagram) is simply a 1-in. lubricated plug cock with a handle permanently attached. A supply of gas at about 100 lbs. per sq. in. pressure is delivered to the emergency valve through regulator (19). Opening an emergency valve therefore applies pressure simultaneously to lines (20), (21) and (22). Pressure is kept from building up in these lines from leakage through the emergency valves by providing small permanent bleeds, whose capacity is negligible as compared to the plug-cock capacity and yet is sufficient to bleed off any leakage.

The application of pressure to line (22) simultaneously operates piston-operated plug valves (23) and (24), shutting off outside the plant fence the flow of wet gas into the plant and opening a 3-in. valve to the stack line to blow down pressure from the system ahead of the separator. Applying pressure to line (20) closes a similar plug cock (25), which shuts off the gas return pipe system, and thus prevents possible back-flow into a failure within the plant.

Pressure applied to line (21) opens diaphragm valve (17), releasing pressure from the pilot system which operates valves (13) and (16), thus shutting down the compressors as already described. The pressure also operates pilot diaphragm valve (26), which applies pressure to the diaphragm of main compressor suction relief regulator (27), causing the latter to open and blow down plant pressure to the stack line through a second channel.

Thus the operation of any one of these emergency valves almost instantly isolates the plant from the gathering and return pipe systems, shuts down the compressors and blows down pressure within the plant through two 3-in. valves in parallel. The purpose of the system is, of course, to protect the plant from destruction, which might result from a minor initial accident which would give time for operation of the protective system.

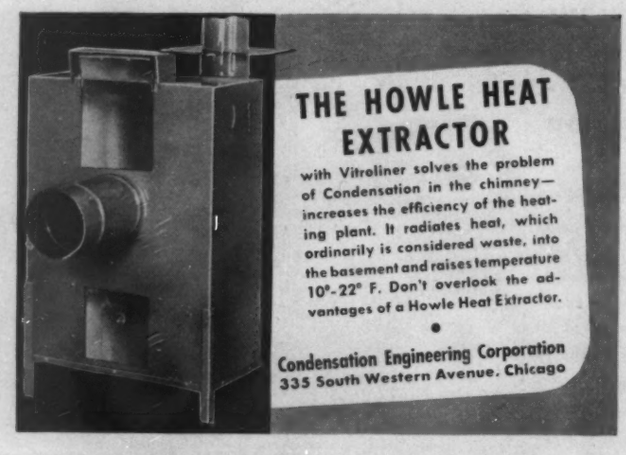
This last discussion illustrates the application of control equipment to promote plant safety, which is a function entirely distinct from the usual processing applications. Often, as in several of the details just described, the two functions can be combined by the addition of a small amount of auxiliary equipment, thus giving the plant important protection at small expense.

■ ■

Missouri Utility Appoints Three New Executives

William McClellan, Edward T. Gushee and John A. Woodbridge have recently been named to executive positions in the St. Louis County Gas Co., Webster Groves, Mo., and the Union Electric Co. of Mo., St. Louis. Mr. McClellan became a director and acting president, Mr. Gushee a director and acting executive vice president, and Mr. Woodbridge a vice president of the companies.

The three men replace Louis H. Egan, Frank J. Boehm and Albert C. Laun who withdrew from their offices May 16.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with Vitroliner solves the problem of Condensation in the chimney—increases the efficiency of the heating plant. It radiates heat, which ordinarily is considered waste, into the basement and raises temperature 10°-22° F. Don't overlook the advantages of a Howle Heat Extractor.
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AND TRAFFIC WENT ON AS USUAL

The photograph to the left shows a Greenlee Hydraulic Pipe Pusher being used to push pipe under a newly paved street, which is part of National Highway 20. Had it been necessary to install the pipe by trenching, it would have been an expensive job, not to mention the damage to the pavement and the inconvenience to traffic.

When a Greenlee Hydraulic Pipe Pusher is available, there need be no thought of tearing up streets or lawns. All that is necessary is a trench long enough to take the pusher with a section of pipe, and one man can stand in a comfortable position and send pipe where it is wanted, simply by pumping the levers.

GREENLEE *Hydraulic* PIPE PUSHER

Let us send complete information on this money-saving tool. No obligation, of course.

Here is a tool that is easy to take to the job and simple to set up and operate. It has capacity for 4-inch or smaller pipe and will develop a pressure of 40,000 pounds against the pipe clamp. Since it operates on a notched steel base, the pipe clamp is reset only when the end of the base is reached.

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Industrial Gas Section Holds Hotel and Restaurant Sales Meeting

ABOUT 200 members of the Industrial Gas Section of the A.G.A. convened at the Hotel St. George, Brooklyn, N. Y., for the 1939 A.G.A. Conference on Hotel, Restaurant and Commercial Gas Sales, May 22-23.

Frank B. Herty, Brooklyn Union Gas Co., vice chairman of the program committee, arranged the details of the meeting and acted as host. The various sessions were presided over by Mr. Herty, Frank H. Trembly, Jr., chairman, and Franklin T. Rainey, vice chairman, A.G.A. Industrial Gas Section. In conjunction with the conference was an 18-unit exhibit of the latest models of gas-fired counter appliances manufactured by 10 companies.

Roy P. Wilson, The Philadelphia Gas Works Co. and chairman, Commercial Refrigeration Committee, opened the sessions with his address on "Penetrating the Commercial Refrigeration Field." A system for "Making the Most of Salesmen's Time" was urged by Harry A. Sutton, Public Service Electric and Gas Co., Newark. At the luncheon the first day of the convention Clifford E. Paige, president, Brooklyn Union Gas Co., and ex-president of A.G.A., delivered the feature address.

Other speakers on the two-day program were: F. W. Lovejoy, Socony-Vacuum Oil Co.; W. D. Crouch, Robertshaw Thermostat Co.; W. S. Walker, Consolidated Edison Co. of New York, Inc.; Arnold E. Schwarz, The Bryant Heater Co.; Hugh H. Cuthrell, vice president, The Brooklyn Union Gas Co.; Peter G. Pirrie, editor, *Bakers Weekly;* W. L. Tiedeman, Department of Health, State of New York; W. Frank Roberts, president, Standard Gas Equipment Corp.; and R. J. Rutherford, vice president, Worcester (Mass.) Gas Light Co., and president, New England Gas Association.

A symposium on the place of gas in the beauty parlor, patterned after the popular "Information Please" radio program, was conducted by Arthur M. Apmann, Derby Gas and Electric Co.

Turning the burner valves shown above through 90° from the usual setting gives better access for regulating fires and eliminates accidental injuries when aisle is blocked by extended stem.

Minor Equipment Shift Betters Operation

USUAL setting of control valves on gas burners is with the stems projecting away from the boiler face, introducing an unnecessary hazard and cutting down the free walking space and at the same time hindering observation of the flame while regulating fuel flow.

By turning the valve stems through 90 degrees the hand wheels lie within the protection of the gas lines, and at the same time are so located as to be most convenient for the fireman as he adjusts the volume of gas entering each burner.

A second "kink" aiding in bettering operation lies in the location of the unions in the risers just above the valves, with female end upward. With this arrangement one man can change burners and connect them easily, allowing the burner to rest in normal position while tightening the union — the weight being supported by the riser and the bevel of the union assuring accurate spotting.

■ ■

Harrod Heads St. Louis Co.

C. L. Harrod, president of the Laclede Power & Light Co., St. Louis, Mo., was elected president of Central States Power & Light Corp. at a meeting of the board of directors held on June 16, 1939. He succeeds B. F. Pickard, who has been elected to the presidency of the Interstate Power Co., with headquarters at Dubuque, Iowa.

Mr. Harrod will continue as chief executive of the Laclede Power & Light Co. The general offices of both the Laclede and Central States companies are located in St. Louis.

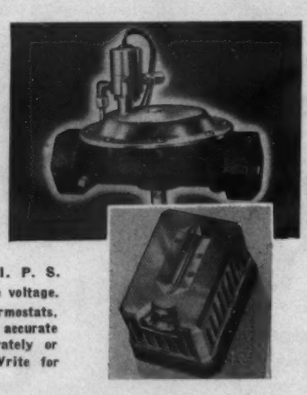
■ ■

Columbia Promotes Bivens

E. D. Bivens, treasurer of Ohio Fuel Gas Co., Columbus, Ohio, resigned recently to become treasurer of the Columbia Engineering Corp. and assistant treasurer of the Columbia Gas and Electric Corp., New York.

Mr. Bivens has been with the Ohio Fuel Gas Co. since 1932. The Ohio company is a subsidiary of the Columbia system.

DISC-OPERATED GAS VALVES
DISC-OPERATED THERMOSTATS
In Complete Packaged Sets



Use Klixon disc-operated gas valves and eliminate solenoid troubles. Being thermally operated, these positive-acting valves don't hum or stick. Nor do they chatter or flutter, since they are actuated by snap-acting time-delay power elements. Suitable for any gas or heater.

Sizes from ⅜ in. to 1¼ in. I. P. S. through 1000 cu. ft. Low or line voltage. Klixon disc-operated room thermostats, for use with gas valves, insure accurate snap-acting control. Sold separately or in packaged sets with valve. Write for full information.

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Mueller Climatrol Jr. Air Conditioning Gas Furnace was selected as the Heating Unit for the New York World's Fair No. 1 Small Home. Proof of Mueller supremacy.

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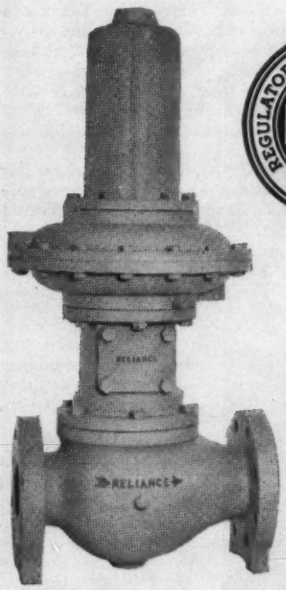
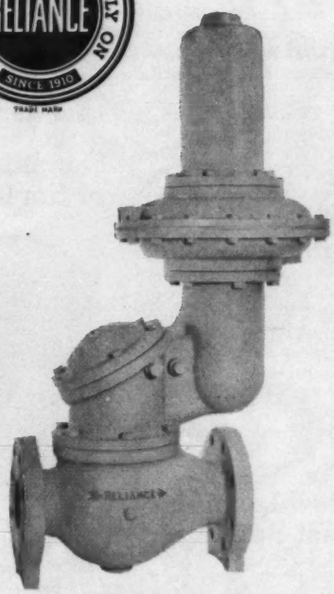


High pressure, spring loaded, CBV-101 direct connected reducing Regulator.



High pressure, spring loaded, CBV-201 offset connected reducing Regulator.

For Perfect Gas Control

Reliance "CBV" (Combination Balanced Valve) Regulators can be operated on inlet pressures up to 600 pounds at a maximum temperature of 150° F.

On distribution and industrial lines they insure perfect control of natural or manufactured gas. They are made in six sizes from 2" to 10" inclusive, in both direct and offset types. In the semi-low and low pressure offset types the power ratio between the diaphragm unit and the valve unit is 3.4 to 1, insuring dependable lockup.

"CBV" Regulators can be used as motor valves, boiler fuel regulators, back pressure regulators or relief valves. They are made in weight loaded, spring loaded and pilot loaded types. Cast iron and cast steel bodies are available with either standard or stainless steel trim.

Send for Bulletin No. 50

RELIANCE REGULATOR CORPORATION

1000 MERIDIAN AVENUE ALHAMBRA, CALIFORNIA

RELIANCE

THREE ESSENTIALS for LASTING PIPE PROTECTION

most ferrous pipe must be **COATED** TO RESIST CORROSION

More than 25 years' experience shows that most types of ferrous pipes break down when exposed to the destructive action of soil corrosion. Such pipes give low-cost service only when protected with a corrosion-resistant coating.

coatings must be **WRAPPED** FOR REINFORCEMENT

The toughest coating can be seriously damaged by soil stresses and earth loads. To keep maintenance from becoming a problem, the coating must be shielded or reinforced with a durable wrapping.

the best wrapping is **ASBESTOS** PIPE-LINE FELTS

Made of asbestos fibers—inorganic and non-tubular—J-M Pipe-Line Felt cannot support capillary action. Strong and durable, it effectively prevents distortion and abrasion of coatings. Its high corrosion resistance assures efficient protection for coatings—minimum upkeep costs.

• • •

YOU'LL BE INTERESTED in learning how J-M Asbestos Pipe-Line Felts add years to the life of pipe under any service conditions. For details, write Johns-Manville, 22 E. 40th St., New York, N.Y.

JOHNS-MANVILLE JM PRODUCT

ASBESTOS PIPE-LINE FELTS

FREE SURFACE AREA INCREASED OVER 17%

WITH NEW ELECTRO-BRONZE PLATED STEEL GRILL

Now Fraser offers **new floor furnaces** with unbreakable steel grills . . . New grill allows 88% surface circulation area compared with 75% or less with cast iron grills—an increase of over 17% . . . The electro-bronze plating is smartly modern—harmonizes with floor finish. . . The smaller meshes prevent small articles dropping through register . . . grill lifts out completely, making cleaning easier. Also equalized intake and output—greater radiation—hinged observation cap—and many other improved Fraser features.

GET EXTRA PROFITS WITH

FRASER
GAS HEATING EQUIPMENT

Manufactured by FRASER FURNACE CO. Stockton, Calif.

Distributed by H. R. BASFORD CO. San Francisco Los Angeles

Its resistance to corrosion saves you money

COPPER TUBE for small mains and services

Also economically ideal for Butane-Propane installations, hot water distribution lines and hot water heating lines. 3922

ANACONDA

THE AMERICAN BRASS COMPANY
WATERBURY • CONNECTICUT
Subsidiary of Anaconda Copper Mining Company

E. C. Cox, Southern Counties Gas Co. Secretary, Dies

E. CLOSSON COX, secretary of Southern Counties Gas Co., of Los Angeles, died suddenly June 13. En route to Kansas City on a vacation trip, he became ill on the train, and died shortly after he was removed to a hospital. Heart failure is given as the cause of his death.

Mr. Cox, a native of Philadelphia, was 51 years of age. He has been associated with the Southern Counties Gas Company since 1920, coming to Southern California in that year after several years service as accountant and statistician with the Lehigh Valley Railroad in Philadelphia and Jersey City and the Philadelphia Electric Company.

Directors of the company have elected Guy E. Steller as secretary to the company to succeed Mr. Cox, and W. J. McCoy, for many years comptroller of the company, was elected a director, according to an announcement from F. S. Wade, president. Mr. Steller has been with the company since 1916, formerly being assistant to W. R. Thompson, vice president in charge of construction and engineering.

■ ■

A.G.A. Plans New Laboratory For Pacific Coast Branch

Plans for construction of the new Pacific Coast Branch Testing Laboratories building in Los Angeles are being made by the Laboratories' Managing Committee of the A.G.A. The new building will be approximately five miles from the center of Los Angeles, on the corner of Downey Road and Eleventh Street. It is expected that contract for construction will be awarded early in July.

Tentative plans provide for an earthquake-proof structure with approximately 10,000 square feet of floor space, or more than twice the floor space afforded by the present leased quarters. A. F. Bridge and R. M. Conner are in charge of construction plans for the new building.

The new building will enable the laboratories to more adequately meet the increasing demands of western manufacturers of gas appliances.

■ ■

Iowa Gas Co. Remodels Office to Subdue Noise

As a part of its three-year building improvement program the Cedar Rapids, (Iowa) Gas Co. has attempted to reduce noise in its main office and public lobby by putting in an accoustical ceiling and accoustical plaster side walls. Noiseless typewriters were provided for stenographers, and a thick carpet laid on a large portion of the floor. The sales department has been refurnished with comfortable chairs for patrons.

Other improvements recently made include a first floor lounge for women employes, an employes' kitchen, air conditioning, model kitchen and recreation room, and a basement room for cooking schools and public entertaining.

■ ■

Vinson Supply Co. Appointed By Fisher Governor Co.

Fisher Governor Co. of Marshalltown, Iowa, has recently appointed the Vinson Supply Co., Tulsa, its exclusive agent for Fisher control specialties in the mid-continent area. According to P. A. Elfers, Fisher sales manager, the Vinson company's territory will include Oklahoma, Southern New Mexico, Western Arkansas, Dallas and Forth Worth area of Texas, West Texas and the Texas Panhandle. B. W. Vinson, president of the Vinson Supply Co., stated that a new district sales office has been opened in Dallas to serve the Texas territory. G. B. Lane, vice president of the Vinson Supply Company, will manage this new Dallas office.

Charles D. Peterson, district manager for Fisher, will continue as a direct factory representative, with headquarters at the Vinson offices in Tulsa.

■ ■

Fairchild Made President of Sprague Meter Co.

F. L. FAIRCHILD

F. L. Fairchild, formerly vice president of the Sprague Meter Co., Bridgeport, Conn., has been elected president and general manager of the company to succeed the late W. P. Hutchinson. Mr. Fairchild has been with the Sprague company since 1913, being first employed as draftsman. He was subsequently promoted to chief engineer, assistant general manager and vice president.

Other officers elected were Miss A. I. Ayre, treasurer and secretary, and Miss N. J. Foley, assistant secretary and treasurer.

■ ■

New Rate Schedule Adopted By Southern Calif. Gas Co.

New rate schedules for domestic, commercial and industrial customers of Southern California Gas Co., Los Angeles, went into effect with meter readings made on and after June 30, it was announced by the California Railroad Commission. The major portion of the $1,305,000 annual reduction, which was ordered by the Commission after an informal investigation, will be enjoyed by customers served under the company's domestic and commercial schedules. These two classes of gas users will receive annual savings totaling $1,240,000, while reduction in industrial schedules will total $65,000 a year.

The average reduction on general service schedules approximates three per cent, and affects the company's entire system, serving 696,414 domestic and commercial customers.

■ ■

New Company Plans to Bring Gas to Northwest Area

The Spokane Pipe Line Co., a recently incorporated company, has announced its plans to build a 300-mile line from northern Montana to Spokane, Wash., where there is an estimated market of 50,000,000 cu. ft. of gas per day.

Incorporators of the new company are A. B. Cobb, an operator in Cut Bank and Lance Creek, Mont., Frank Miller, associated with Mr. Cobb, E. B. Coolidge, of the Montana Gas Corp., and LaRue Smith, Montana representative of Texas Pacific Coal and Oil Co.

■ ■

Hot Springs, N. M., Votes Franchise For Gas Plant

A commercial gas plant will be constructed in Hot Springs, N. M., as a result of a franchise granted June 12, and construction work by the Superior Manufacturing Co., Amarillo, Texas, was scheduled to start last month.

PROTECTS GAS USERS

"CALODORANT" gives a swift warning against leak danger.

CALODORANT gas odorizing agent has a distinctive and penetrating odor that is generally associated with manufactured gas.

For over eight years leading gas companies have found it to be a vigilant detector of dangerous and costly leaks. Immediately upon the addition of CALODORANT to gas it gives warning of leaks in distributing systems and household appliances . . . a warning that may prevent loss of life and property. It adds no odor to burning gas. It is non-corrosive . . . non-injurious to equipment or users. CALODORANT will remain completely vaporized during long periods of transmission and the odorizing power remains unimpaired.

CALODORANT

REG. U. S. PAT. OFF.

GAS ODORIZING AGENT

AVAILABLE IN TANK CARS AND IRON BARRELS

Address Inquiries to

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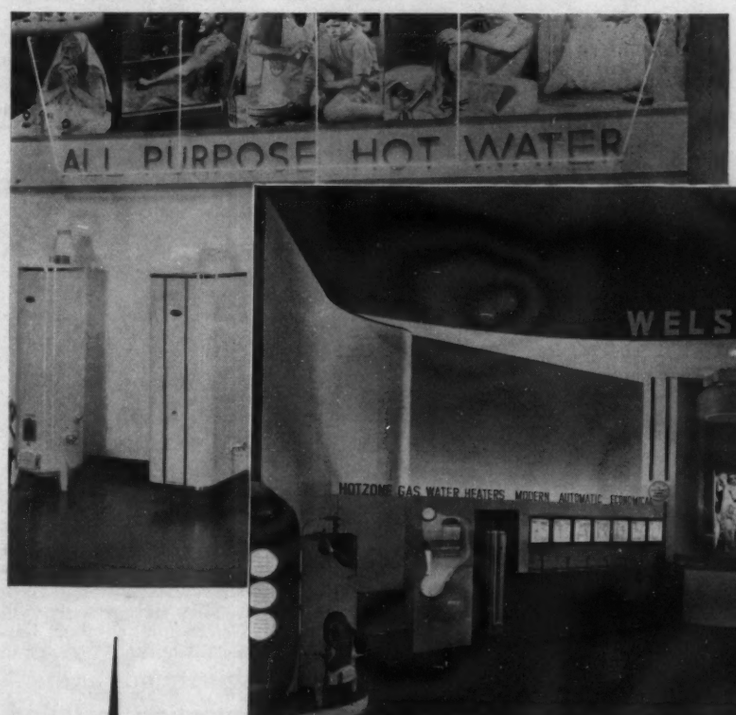

Golden Gate Exhibit

New York World's Fair Exhibit

At the left are portrayed the impressive exhibits of Welsbach products at the New York World's Fair and San Francisco Golden Gate Exposition. They are excellent examples of Welsbach's faith in gas as the modern fuel of today and tomorrow.

For over 52 years Welsbach products wherever installed have aided in increasing the domestic market for gas.

©NYWF

Gas Industries Building, New York World's Fair 1939

See the Welsbach Exhibits

WELSBACH COMPANY

Gloucester City, N. J.

Branches in Chicago and San Francisco

GOLDEN GATE INTERNATIONAL EXPOSITION 1939 SAN FRANCISCO BAY

Homes and Gardens Building, Golden Gate Exposition 1939

Copper Company's Needs May Spur Construction

THE investment of $1,500,000 by the El Paso Natural Gas Co. for the construction of an additional 100 miles of 16-in. and 12¾-in. pipe line between the Lee County, N. M., gas fields and Deming, N. M., was to be determined by the company's board of directors in a New York meeting scheduled for July 5, according to C. C. Cragin, vice president and general manager.

The necessity of providing for an additional supply of natural gas is largely due to the increasing needs of three large companies — the Nevada Consolidated Copper Corp., using 2,000,000 cu. ft. per day at its Hurley, N. M., smelter; the Phelps-Dodge organization in the new clay body copper workings near Morenci, Ariz., and the Globe-Miami copper mines.

The proposed project would increase the present capacity of the company's pipe line from 80,000,000 cu. ft. to about 95,000,000 cu. ft. per day, it is expected by officials.

Mr. Cragin stated that it would not be necessary to lay a pipe line the entire distance, as the expansion could be carried out by loops near booster stations. Three new sections would have to be laid between El Paso and the gas field and other sections between El Paso and Deming.

GEORGE A. BURRELL

Petroleum and Gas Engineer

Design—Construction—Reports

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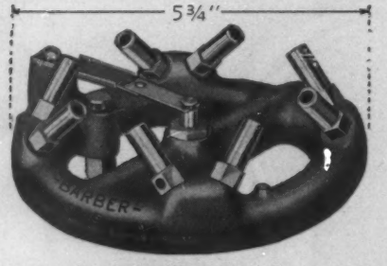
For BUTANE Gas You Can Rely On

BARBER Appliance BURNERS



No. S. P.-15 Barber Burner with Safety Pilot

Any gas-burning appliance can be equipped with a Barber Burner with special drilled jets to meet the requirements of Butane Gas. Servicing and backfiring are eliminated. There's a proper, reliable Barber unit for every size and type of appliance — and Barber means top efficiency. Write for complete literature, prices and discounts on the Barber line of Conversion Burners, Appliance Burners, Controls and Regulators.

The Barber Gas Burner Co.
3704 Superior Avenue Cleveland, Ohio

Laboratories' Engineers Resign; Join Manufacturers

After three years of service with the A.G.A. Testing Laboratories, Stanley F. Jaros and Donald E. DuPerow have resigned to become associated with member manufacturer companies.

Mr. Jaros has been appointed heating engineer for Servel, Inc., Evansville, Ind. A graduate in civil engineering from the Ohio State University, he has served in both the testing and research departments of the Laboratories.

Mr. DuPerow has joined the Lincoln Brass Works, Inc., Detroit, as engineer. He entered the Laboratories after his graduation in mechanical engineering from Ohio Northern University, and has worked in the testing and inspection department.

Cincinnati Employes Given Night School Awards

Climaxing a decade of leisure-time study, the University of Cincinnati evening college graduated three employes of the Cincinnati Group of the Columbia Gas & Electric Corp. on June 9. They were Robert W. Alexander, assistant superintendent, city district gas distribution, who attended 11 years; Harry J. Schierenbeck, draftsman, gas commercial, a nine year student, and George J. Brunner, inspector, who also spent nine years at the school. Each of the first two attained the degree of bachelor of science in mechanical engineering, and Mr. Brunner will receive an electrical engineering degree.

A total of 121 Columbia employes attended the evening college the past year.

Canadian Utility Conducts Successful Sales Campaign

More than 17,142,000 cu. ft. of gas were added to the regular load of the British Columbia Electric Railway Co., Vancouver, B. C., during the annual president's month campaign sponsored by the general sales department in honor of W. G. Murrin, president of the company. This gain was 104 per cent of the quota set by the gas section of the company.

A total of 654 major gas and electric appliance prospects were submitted by employes during the month of May, and from these 109 sales were closed.

W. C. Mainwaring is general sales manager of the company.

W. R. Squier Named to A.G.A. Advertising Committee

Major T. J. Strickler of Kansas City, chairman of the A. G. A. Committee on National Advertising, announces the appointment of Wilmot R. Squier, advertising manager, Washington Gas Light Co., Washington, D. C., to the Sub-committee on Approval of Domestic Gas Copy. Mr. Squier has been a member of the Association's Publicity and Advertising Committee for several years.

Taylor Heads Florida Co.

J. D. Taylor, formerly southern representative of Pittsburg Water Heater Corp., has been appointed manager of the Bartow, Fla., office of the Central Florida Gas Corp.

Advertising Group Elects E. K. Hartzell President

E. K. HARTZELL, East Tennessee Power and Light Co., was elected president of the Public Utilities Advertising Association at its June convention held in New York in conjunction with the Thirty-fifth Annual Convention of the Advertising Federation of America. Mr. Hartzell succeeds Howard Weeks, Consolidated Edison Co., of New York, who was named a director. Among directors elected was Kenneth Magers, Cincinnati Gas Co.

Other officers elected were: First vice president, H. J. Rowe, Iowa Electric Light and Power Co.; second vice president, A. C. Joy, Pacific Gas and Electric Co., San Francisco; third vice president, Clara Zillessen, Philadelphia Electric Co.; secretary, H. W. Olcott, Bozell & Jacobs, of Indianapolis; treasurer, T. H. Spain, Public Service Electric and Gas Co., Newark.

During the meeting announcement was made of the winners among utility companies in various merchandising classifications.

Michigan Co. Equips Plant To Manufacture Gas

Equipment for making gas from 34-36 gravity gas oil has been installed in the Grand Haven, Mich., gas plant. This is the fourth installation of this type in the world, according to Frank Mason, manager.

The equipment is to be used for supplementing the regular gas supply during peak loads, and will increase capacity of one bench from 70,000 cu. ft. to 120,000 cu. ft. per day. Installation was made by the Improved Equipment Co., New York City, at a cost of $2500.

Gas is produced with the new equipment by injecting oil into the back end of retorts. The oil is then vaporized by steam, and gas is generated upon striking hot coals in retorts.

Omaha District Authorized To Enrich Gas Content

The Omaha Metropolitan Utilities District has recently been authorized by the Nebraska State Legislature to increase the natural gas content of the manufactured gas sold to Omaha users from 49 per cent to 75 per cent, or to a heating value of approximately 800 B.t.u. Directors of the utilities district estimate the bill will mean a saving of nearly 20 per cent to the consumers.

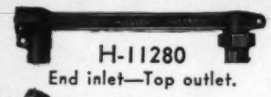
The bill also authorizes the directors to adopt safety rules and regulations, and increases the limit of the district's borrowing capacity from $150,000 to $500,000 in the event of an emergency.

Detroit-Michigan Stove Co. Names Sales Managers

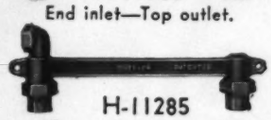
John C. Pankow, director of sales, Detroit-Michigan Stove Co., has announced the appointment of E. J. Shermire as sales manager of the company's Garland Heavy Duty Equipment Division. Added duties have been given to Fred A. Kaiser, sales manager, who will supervise the sales of Detroit Jewel and Garland domestic ranges to utility companies in addition to dealers.

Cathodic Protection Installed

The Elizabethtown Consolidated Gas Co., of Elizabeth, N. J., is installing cathodic protection to prevent soil corrosion on some of its 4- and 6-in. steel gas lines. Frank Engel is the superintendent of distribution. The cathodic protection work is being engineered by Robert J. Kuhn of New Orleans, La.



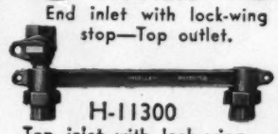
H-11280
End inlet—Top outlet.



H-11285
Elbow inlet—Top outlet.

H-11287
U-type inlet—Top outlet.

H-11295
End inlet with lock-wing stop—Top outlet.



H-11300
Top inlet with lock-wing stop—Top outlet.

1. Threads protected from rust and side strain.
2. Pipes braced and aligned.
3. Bevel centers and aligns connector.
4. Only two connections — no union joints or gaskets.
5. Accurate threading and dimensions.

H-11160 H-11162 H-11164

Mueller Meter Swivels are made in both malleable iron and brass. The offsets are evenly curved, assuring full pipe opening from end to end. Shoulders and threaded ends are in accurate alignment.

Drop that Crowbar!

The patented bevel centering connector feature of Mueller Meter Bars eliminates the need for prying or straining meters to get them into accurate alignment. With this exclusive feature, the bevel face on the bar is pulled together with the bevel connector at the pipe by means of a malleable nut. This forms a rigid connection of accurate registration and alignment that actually increases the strength of the installation because the threaded sections (which are the weaker sections) are braced by the walls of the meter bar and can easily withstand the strain of shifting or settling pipes.

It makes no difference if your installations are single or multiple, Mueller Meter Bars offer you the means of a clean-cut, accurate and rigid installation that protects the meters from damage and lessens repairs. Consult your red Mueller Gas Catalog H for the many styles and types available or write us for full information concerning your requirements.

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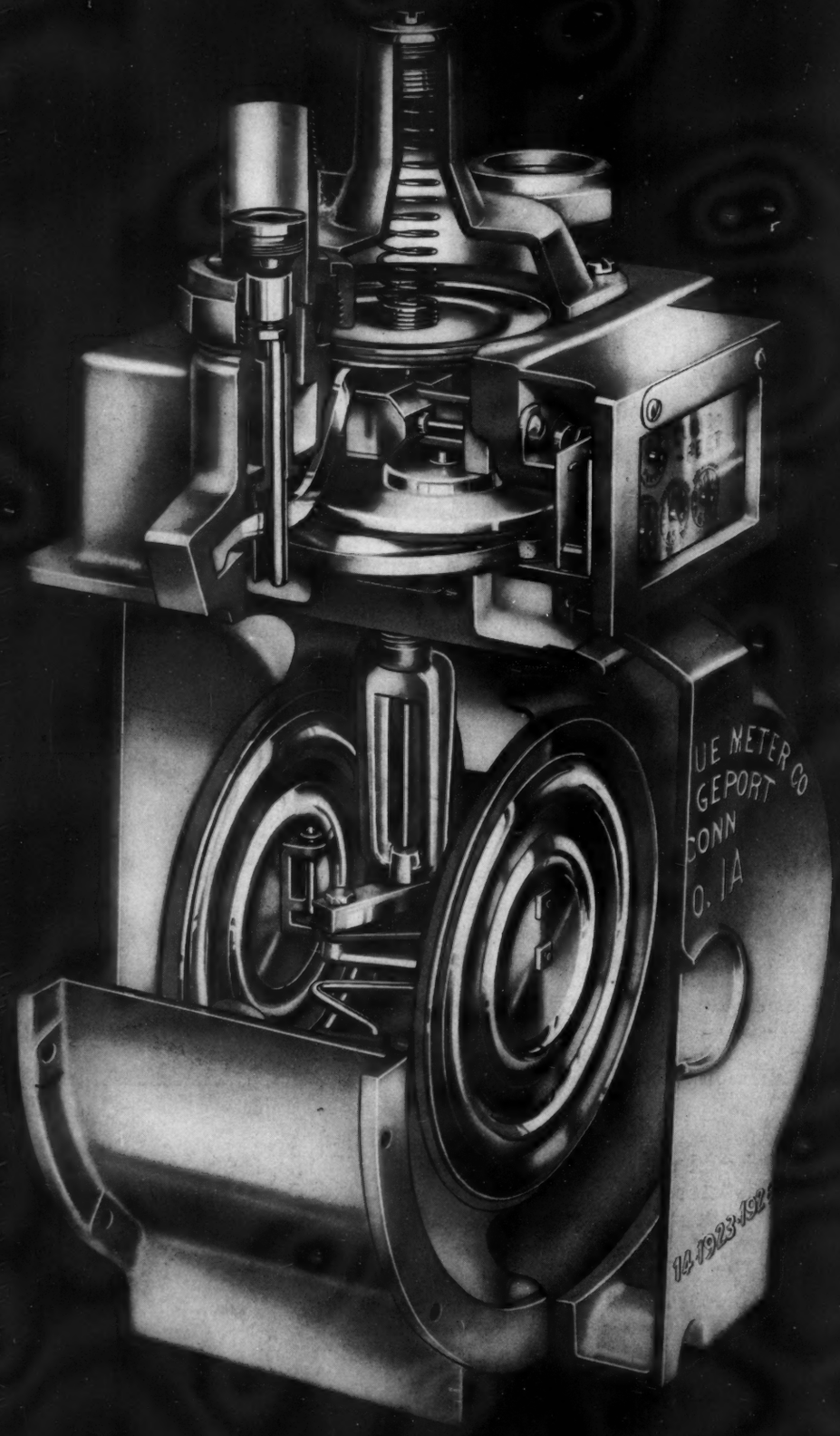
CHATTANOOGA, TENN. NEW YORK, N. Y.

Sprague Leads Again



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The latest achievement in Gas Measurement and Control . . . a combination Meter and Regulator. Write for particulars.

THE SPRAGUE METER CO., BRIDGEPORT, CONN.